The Alberta Journal of Educational Research

Vol. VI, No. 1 *March, 1960*

THE COMMITTEE ON EDUCATIONAL RESEARCH
Faculty of Education
University of Alberta

CAMROSE LUTHERAN COLLEGE
LIBRARY

ACKNOWLEDGMENT

This publication was made possible by funds granted by Carnegie Corporation of New York. That Corporation is not, however, the author, owner, publisher, or proprieter of this publication, and is not to be understood as approving by virtue of its grant any of the statements made or views expressed therein.

THE MATHEMATICAL COMPETENCE OF PROSPECTIVE ELEMENTARY TEACHERS

L. Doyal Nelson and Walter H. Worth
Faculty of Education
University of Alberta

Research evidence accumulated in the United States indicates that many prospective elementary teachers have neither facility in the computational processes which they are expected to teach nor a firm grasp of the mathematical concepts which underlie these processes (3, 4, 10, 11, 12, 16). There is also some evidence of a similar lack among experienced elementary teachers (1, 4, 16). These findings, when coupled with the view expressed by the Commission on Post-War Plans of the National Council of Teachers of Mathematics that "you cannot teach what you do not know," (6, p. 324), have given rise to a number of proposals for modifying the mathematics preparation being provided for prospective elementary teachers (2, 5, 8, 9, 13, 14, 15).

Do prospective elementary teachers in Alberta exhibit a similar lack of facility and understanding in the field of mathematics? The present study seeks a partial answer to this question. The findings may prove helpful in appraising proposals for the improvement of the mathematics preparation of prospective elementary teachers in this Province.

Purpose Of The Study

1. To determine the achievement level of prospective elementary teachers in the mathematical processes commonly taught in Grades I to VI.

2. To ascertain the degree to which prospective elementary teachers understand the mathematical concepts underlying these processes.

3. To compare the mathematical facility and understanding of selected groups of prospective elementary teachers in Alberta and the United States.

Method

Subjects

The subjects of this investigation were 468 prospective elementary teachers enrolled in the Faculty of Education at the University of Alberta in September, 1959. Included were 311 one-year Junior Elementary students; and 64 first-year, 66 second-year, 21 third-year, and 6 fourth-year Bachelor of Education degree students.

The mathematics preparation and teaching experience of these students is indicated in Table I.

TABLE I

COMPARISON OF STUDENTS ENROLLED IN ELEMENTARY EDUCATION IN SEPTEMBER, 1959, WITH REGARD TO MATHEMATICS PREPARATION AND TEACHING EXPERIENCE EXPRESSED IN PER CENT

	Jr.E.		B.Ed 1		B.Ed. 2		B.Ed. 3		B.Ed. 4	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Grade XII Mathematics ("B" or higher standing)	60	40	94	6	83	17	38	62	50	50
University Mathematics (Content)	0	100	0	100	0	100	14	86	17	83
Method of Teaching Mathematics	0	100	0	100	41	59	95	5	100	0
Teaching Experience	0	100	0	100	20	80	71	29	33	67

The comparative subjects were 52 seniors in elementary education observed by Phillips (12) at the University of Illinois, and 348 sophomores, juniors, and seniors in the elementary teacher-education program at Boston University examined by Weaver (16).

Instruments

The Phillips Achievement Test in Elementary Arithmetic (12) was used to measure facility in mathematical processes. The Phillips Test consists of 40 items designed to assess operational skills in performing the conventional operations in whole numbers, common fractions, decimal fractions, per cents, and verbal problems which are commonly taught in the elementary school. Understanding of the mathematical concepts underlying these processes was measured by Glennon's Test of Basic Mathematical Understanding (4). Glennon's test is made up of 80 items coverning five areas of basic mathematical understanding: the decimal system of notation, integers and processes, fractions and processes, decimals and processes, and rationale of computation.

Data Collection

The tests were administered at the time of registration in September, 1959. No time limits were applied to the administration of either test. The students were permitted to work at their own rate and take as long as they wished to complete the tests. All students took the Phillips Test and then the Glennon Test. The scoring was done according to a key by a trained marker. Weaver

(16) reports following a similar procedure in giving the Glennon Test to the Boston students during the period from 1953 to 1955. Phillips (12) administered his test to the Illinois group in 1959 in much the same fashion.

Data concerning the students' backgrounds were secured by means of a simple questionnaire completed by the students at the outset of the testing period, and from official university records.

Statistical Treatment

Means and standard deviations were calculated for each of the Alberta groups on the Phillips and Glennon Tests. Comparisons were then made between the mean scores of the Alberta groups, and those reported for similar groups in the United States on the same tests. Weighted t values were obtained by the Cochrane-Cox method (7) to test the significance of differences between means. No assumptions were made about the population variance. Critical values for t were set at the .05 level.

Findings

Mathematical Processes

The scores made by each of the Alberta groups on the Phillips Achievement Test in Elementary Arithmetic are indicated in Table II. Also shown in Table II are the scores of prospective elementary teachers at the University of Illinois.

TABLE II

SCORES OF PROSPECTIVE ELEMENTARY TEACHERS ON THE PHILLIPS ACHIEVEMENT TEST IN ELEMENTARY ARITHMETIC

	Alberta				Illinois
	Jr.E.	B.Ed. 1	B.Ed. 2	B.Ed. 3 & 4	Seniors
N	311	64	66	27	54
Mean	30.84	30.78	31.56	32.46	27.52
S.D.	6.51	6.47	5.72	7.25	8.31

As Table III shows, the mean scores of each of the Alberta groups were significantly higher than that of the Illinois group. No significant differences were observed, however, among any of the Alberta groups.

Mathematical Concepts

The scores made by each of the Alberta groups on the Glennon Test of Basic Mathematical Understanding are indicated in Table

IV. The scores of the elementary education students at Boston University are also shown in Table IV. Use of a composite score for this latter group was supported by Weaver's (16) report that the means of the freshman, sophomore, and senior groups did not differ significantly among themselves.

TABLE III

SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS ON THE PHILLIPS ACHIEVEMENT TEST IN ELEMENTARY ARITHMETIC

	B.Ed. 1		B.Ed. 2		B.E.d. 3 & 4		Illinois Seniors	
	$t_{crit.}$	$t_{obs.}$	$t_{crit.}$	$t_{obs.}$	$t_{crit.}$	$t_{obs.}$	$t_{crit.}$	$t_{obs.}$
Jr.E.	1.99	0.07	1.99	0.91	2.05	1.13	2.01	2.74*
B.Ed. 1			2.00	0.73	2.04	1.04	2.01	2.31*
B.Ed. 2					2.04	0.58	2.01	2.41*
B.Ed. 3 & 4							2.04	2.73*

*Significant beyond the .05 level.

TABLE IV

SCORES OF PROSPECTIVE ELEMENTARY TEACHERS ON THE GLENNON TEST OF BASIC MATHEMATICAL UNDERSTANDING

	Alberta				Boston
	Jr.E.	B.Ed. 1	B.Ed. 2	B.Ed. 3 & 4	Composite Group
N	302	63	66	27	348
Mean	56.17	57.24	60.41	62.11	44.60
S.D.	9.27	9.34	7.91	7.79	11.87

As is shown in Table V, the mean scores of each of the Alberta groups were significantly higher than that of the Boston group. The mean score of the B.Ed. 2 group was significantly higher than that of either the B.Ed. 1 or Jr. E. group. Similarly, the mean score of the B.Ed. 3 and B.Ed. 4 group was significantly higher than that of either the B.Ed. 1 group or the Jr. E. group.

TABLE V

SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS OF THE GLENNON TEST OF BASIC MATHEMATICAL UNDERSTANDING

	B.Ed. 1		B.Ed. 2		B.Ed. 3 & 4		Boston Group	
	$t_{crit.}$	$t_{obs.}$	$t_{crit.}$	$t_{obs.}$	$t_{crit.}$	$t_{obs.}$	$t_{crit.}$	$t_{obs.}$
Jr.E.	1.99	0.82	1.99	3.69*	2.00	3.74*	1.96	14.23*
B.Ed. 1			2.00	2.07*	2.03	2.55*	1.99	9.50*
B.Ed. 2					2.04	0.95	1.99	13.75*
B.Ed. 3 & 4							2.04	10.81*

*Significant beyond the .05 level.

Discussion

From these data it might be inferred that in a comparative sense the mathematical competence of prospective elementary teachers in Alberta is, on the average, relatively high. Additional support for this point-of-view may be found in the fact that experienced teachers on the Atlantic seaboard (4), and in the State of Utah (1), are reported to have obtained mean scores on the Glennon Test of only 43.82 and 52.46 respectively.

It cannot be inferred from the data of this exploratory study, however, that prospective elementary teachers in Alberta have necessarily achieved a desirable or undesirable level of competence in the field of mathematics. For even if it is assumed that the Phillips and Glennon Tests are valid and reliable measures of the mathematical competence required for effective teaching in the elementary school, there is likely little agreement concerning what constitutes a desirable level of achievement by prospective elementary teachers on these or similar tests. Should prospective elementary teachers know more mathematics than they will be expected to teach, and thus be expected to secure almost perfect scores on tests of the processes and concepts which underly the mathematics program which they will be certified to teach? Or are almost perfect scores unrealistic in view of the possible influence of such factors as disuse, retroactive inhibition, intelligence, and attitude toward mathematics on test performance? And further, should the expectancies with regard to the mathematical competence of prospective elementary teachers reflect what is needed to perpetuate the status quo, or what is thought to be needed to improve instruction in

mathematics? The findings of this study contribute little to the answering of these kinds of questions.

Nonetheless, the findings of this study do not appear to be entirely void of implications for teacher-education at the elementary level. For it was observed that, in general, those groups of students with the most experience in mathematics, in the form of course(s) in mathematics methods or content, and/or teaching experience in elementary mathematics, evidenced a higher level of performance on the Phillips and Glennon Tests. This fact, when coupled with the tendency toward greater variability in test performance among those groups with the least experience in mathematics, seems to suggest what may be the obvious—that competence in mathematics varies directly with the amount of experience in mathematics.

But the obvious is sometimes overlooked. At the present time students in the degree program in elementary education offered at the University of Alberta devote less time to the study of mathematics than any other subject commonly taught in the elementary school. In fact, there is no required study of the basic content of mathematics as there is in science, social studies, English, and the fine arts. The only mathematics requirement is a half-year course in methods of teaching elementary mathematics. It is apparently assumed that students preparing to be elementary teachers enter the program with sufficient knowledge of mathematics to become effective teachers. No such assumption is made with respect to the students' basic preparation to teach any other elementary school subject, however. If the quality of mathematics instruction depends, at least in part, upon the mathematical competence of the teacher, then some reappraisal of the mathematics aspects of the elementary teacher-education program would appear to be in order.

REFERENCES

1. Bean, J. E. "Arithmetical Understandings of Elementary School Teachers." *Elementary School Journal,* 59 (May, 1959), pp. 447-50.
2. Boyer, L. E. "Preparation of Elementary Arithmetic Teachers." *Emerging Practices in Mathematics Education.* Washington: National Council of Teachers of Mathematics, 22nd Yearbook, 1954, pp. 172-80.
3. Buswell, G. T. "The Content and Organization of Arithmetic." *Arithmetic Teacher,* 6 (March, 1959), pp. 77-83.
4. Glennon, V. J. "A Study in Needed Redirection in the Preparation of Teachers of Arithmetic." *Mathematics Teacher,* 42 (December, 1949), pp. 389-96.
5. Grossnickle, F. E. "The Training of Teachers of Arithmetic." *The Teaching of Arithmetic.* Chicago: National Society for the Study of Education, 50th Yearbook (Part II), 1951, pp. 203-31.
6. "Guidance Report of the Commission on Post-War Plans." *Mathematics Teacher,* 40 (November, 1947), pp. 315-39.
7. Johnson, P. O. *Statistical Methods in Research.* New York: Prentice-Hall, 1949, pp. 74-5.

8. Mueller, F. and Moser, H. "Background Mathematics for Teachers of Arithmetic." *Emerging Practices in Mathematics Education.* Washington: National Council of Teachers of Mathematics, 22nd Yearbook, 1954, pp. 180-88.
9. Newsom, C. V. "Mathematical Background Needed by Teachers of Arithmetic." *The Teaching of Arithmetic.* Chicago: National Society for the Study of Education, 50th Yearbook (Part II), 1951, pp. 232-50.
10. O'Donnell, J. R. "Arithmetical Achievement, Attitude Toward Arithmetic and Problem Solving Behavior of Prospective Elementary Teachers." Unpublished Doctoral dissertation, Pennsylvania State University, 1958.
11. Orleans, J. S. *The Understanding of Arithmetic Processes and Concepts Possessed by Teachers of Arithmetic.* Office of Research and Evaluation, Publication No. 12. New York: College of the City of New York, 1952.
12. Phillips, C. A. "The Relationship Between Achievement in Elementary Arithmetic and Vocabulary Knowledge of Elementary Mathematics as Possessed by Prospective Elementary Teachers." Unpublished Doctoral dissertation, University of Illinois, 1959.
13. Rappaport, D. "Preparation of Teachers of Arithmetic." *School Science and Mathematics,* 58 (November, 1958), pp. 636-43.
14. Stipanowich, J. "The Mathematical Training of Prospective Elementary School Teachers." *Arithmetic Teacher,* 4 (November, 1957), pp. 240-48.
15. Waggoner, W. "Improving the Mathematical Competence of Teachers in Training." *Arithmetic Teacher,* 5 (March, 1958), pp. 84-86.
16. Weaver, J. F. "A Crucial Problem in the Preparation of Elementary School Teachers." *Elementary School Journal,* 56 (February, 1956), pp. 255-61.

TEACHER LEADER BEHAVIOR AND TEACHING EFFECTIVENESS

A. G. McBeath and J. H. M. Andrews
Faculty of Education

The Problem

How may teacher effectiveness in the classroom be assessed or measured? Innumerable devices have been employed, ranging from tests of pupil progress to teacher personality rating scales. The thesis to be tested in this investigation is that teacher effectiveness in the classroom is related to leadership qualities, and that a measure of the latter is also a measure of the former.

Two instruments were used: first, a Teacher Leader Behavior Description Questionnaire (TLBDQ), an adaptation of the Ohio Leader Behavior Description Questionnaire (2), which has proven useful in commercial and the armed services fields; and second, a global rating scale, to measure teacher effectiveness by means of an over-all or global impression.

Further to the TLBDQ, in 1956 A. W. Halpin (1, p. 175) found that the two dimensions of leadership assessed by the questionnaire were, in his terminology, Initiating Structure (getting things done) and Consideration (human relations). His definitions follow:

> Initiating Structure-in-Interaction refers to the leader's behavior in delineating the relationship between himself and the members of his group, and in endeavouring to establish well-defined patterns of organization. channels of communication, and ways of getting a job done. The leader establishes "Structure" in the way the group members interact with him and with each other so that whenever the group is confronted with a novel problem, the members can resort to these Structures-in-Interaction to facilitate the solution of group problems. Hence the group members are not dependent upon the leader for fresh and specific instructions on how to handle each new problem that arises. (1, p. 174)
>
> Consideration refers to behavior that reflects friendship, mutual trust, respect and warmth in the relationship between leader and group members. This represents the human relations aspect of leader behavior. (1, p. 175)

In marking the global rating scale the standard which the judge was to use was the average teacher in the judge's school. This avoided the great variation which the vague concept of the "ideal" teacher involves. The scale ranged from, "1. Outstanding for this school," to "6. Very low for this school."

Hypotheses

Three hypotheses were proposed for confirmation or rejection. The first postulates that the most effective teachers would be described as being above the average on both Consideration and

Initiating Structure, and the most ineffective teachers would be described as being below the average on both of the leader behavior dimensions.

The second hypothesis states that students' descriptions of the teachers' behavior on both Consideration and Initiating Structure would be related to their ratings of the teachers' effectiveness, but that Consideration would be more closely related.

The third hypothesis states that principals' and superintendents' descriptions of the teachers' behavior on both Consideration and Initiating Structure would be related to their ratings of the teachers' effectiveness, but that Initiating Structure would be more closely related.

Administration

The data were collected from twelve non-city schools in Alberta through personal administration of the questionnaire by the investigator. The staffs of the twelve schools volunteered to take part in the project.

Fifty-nine teachers were studied through descriptions of their leader behavior and ratings of their effectiveness by the 59 teachers themselves, by 571 students, by 50 other teachers, by 12 principals, and by 12 superintendents. The schools were scattered throughout the province. They ranged in size from twenty-seven teacher to eleven teacher schools. Teachers of every grade from eight to twelve were included in the study. Their teaching fields included all the academic subjects plus home economics, commercial, physical education, art, music, and industrial arts. There was a wide range of experience (2 to 35 years), years of training (1 to 7 years), and background. Some of the teachers were recently from other provinces and countries. There were twenty-one females and thirty-eight males.

In each school five teachers were chosen at random to be subjects. At the same time four or five other teachers were selected at random to describe and rate each of the original five teachers. Nine or ten students were also selected to describe and rate each of the five teachers. The students were from grades eight and above and were chosen randomly from the grades and classes that each teacher taught. Each principal and superintendent rated and described the teachers in his school or area.

Findings

Relationships between Effectiveness Ratings and Behavior Descriptions

For each judge the most effective teachers and least effective teachers were selected from the rating scores. For example, when

students were judges, the top 24% of the teachers were selected as the most effective and the lowest 24% were selected as the least effective. In the case of other judges the large number of tied ranks made it impossible to equate the numbers in each group. These two groups of teachers were then categorized from the leader behavior descriptions provided by the same judges who rated their effectiveness. The two categories used were "above the median on both dimensions" and "below the median on both dimensions." The distributions in Table I were tested using Fisher's Exact Probability. The results for all judges except the teachers themselves indicated that there was only a slight probability that the relationships obtained would occur by chance. The results verified the first hypothesis.

TABLE I

NUMBER OF TEACHERS IN HIGH AND LOW EFFECTIVENESS GROUPS SCORING ABOVE THE MEDIAN ON BOTH LEADER BEHAVIOR DIMENSIONS, AND SCORING BELOW THE MEDIAN ON BOTH BEHAVIOR DIMENSIONS

Effectiveness ratings provided by		Leader behavior descriptions: Abvoe median on both dimensions	Leader behavior descriptions: Below median on both dimensions	Probability (one-tailed)
Students	—Upper 14 (24%) on effectiveness	11	2	.00003
	—Lower 14 (24%) on effectiveness	0	11	
Other teachers	—Upper 14 (21%) on effectiveness	8	1	.0002
	—Lower 11 (19%) on effectiveness	0	9	
Principals	—Upper 30 (51%) on effectiveness	19	2	.000001
	—Lower 13 (22%) on effectiveness	0	13	
Superintendents	—Upper 23 (39%) on effectiveness	13	1	.0000025
	—Lower 13 (22%) on effectiveness	0	11	
Teachers	—Upper 9 (15%) on effectiveness	5	1	not significant
	—Lower 12 (20%) on effectiveness	2	5	

NOTE: The significance level was p=.01.

A further test of the first hypothesis was made by using separate judges for effectiveness ratings and behavior descriptions. Thus, one judge provided effectiveness ratings and a different judge was used to provide behavior descriptions of the same teacher. For behavior descriptions provided by students, principals, and superintendents the results indicated that there was still a strong relationship between high and low effectiveness groups and scores on both leader behavior dimensions. The probabilities, though, were increased, that such relationship would happen by chance, over the probabilities obtained when the same judge provided both effectiveness ratings and behavior descriptions. This further substantiated the first hypothesis.

Rank-order correlations were used to indicate the degree of relationship between ratings of effectiveness and descriptions of Consideration behavior and Initiating Structure behavior. These correlations were calculated separately for each dimension. Table II shows the results.

Table II

CORRELATIONS BETWEEN EFFECTIVENESS RATINGS AND BEHAVIOR DESCRIPTIONS BY THE SAME JUDGE

Judge	Correlations between:		Significance of difference between correlations
	Initiating Structure and rating	Consideration and rating	
Students	.57**	.70**	not significant
Other teachers	.64**	.55**	not significant
Principals	.75**	.70**	not significant
Superintendents	.67**	.65**	not significant
Teachers	.18	.28*	not significant

*significant at the .05 level.
**significant at the .01 level.

The correlation coefficients of .57 and .70 in the case of students as judges partially verified the second hypothesis. The correlations were also calculated between the same variables when students provided the effectiveness ratings and other judges provided the leader behavior descriptions. The result was that students related both dimensions of leader behavior to ratings of effectiveness, and Consideration tended to be more closely related, but in some cases the differences in favour of Consideration were not significant.

With principals and superintendents as judges there was a relationship between the two dimensions and ratings of effective-

ness, with little difference between the dimensions. The strongest relationships were exhibited in the case of principals as judges. They were .75 between Initiating Structure and effectiveness ratings and .70 between Consideration and effectiveness ratings. For superintendents the correlations between the same pairs of variables were .67 and .65.

Effectiveness Ratings

The highest median effectiveness rating of the fifty-nine teachers was provided by the other teachers and students while the lowest median was provided by the teachers themselves.

The amount of agreement between raters is shown in Table III. The greatest amount of agreement (.68) was between superintendents and principals and the least amount of agreement (.41), excluding self-ratings, was between superintendents and students. These were significantly different. There was no relationship between ratings provided by the teachers themselves and ratings provided by any other judges.

TABLE III

RANK-ORDER CORRELATIONS BETWEEN RATERS

	Students	Other Teachers	Principals	Superintendents
Other teachers	.56**			
Principals	.43**	.53**		
Superintendents	.41**	.52**	.68**	
Teachers	—.02	.02	—.01	.05

**significant at the .01 level.

Leader Behavior Descriptions

The median scores of the fifty-nine teachers on Initiating Structures were higher than the median scores on Consideration for behavior descriptions by all judges except the teachers themselves. The difference was not tested statistically.

Correlations between scores on Initiating Structure and scores on Consideration ranged from a high of .61 for descriptions by superintendents to a low of .38 for self-descriptions. There was an indication that the dimensions might be partly independent, but the correlations were too high to consider the behavior dimensions to be completely independent of each other.

The amount of agreement between judges on each dimension is shown in Tables IV and V.

TABLE IV

CORRELATIONS BETWEEN JUDGES ON THE INITIATING STRUCTURE SCORES

	Students	Other Teachers	Principals	Superintendents
Other teachers	.51**			
Principals	.38**	.63**		
Superintendents	.29*	.40**	.48**	
Teachers	.39**	.23	.14	.17

*significant at the .05 level.
**significant at the .01 level.

TABLE V

CORRELATIONS BETWEEN JUDGES ON THE CONSIDERATION SCORES

	Students	Other Teachers	Principals	Superintendents
Other teachers	.55**			
Principals	.44**	.60**		
Superintendents	.52**	.38**	.43**	
Teachers	.42**	.23	.22	.09

**significant at the .01 level.

The most agreement on Consideration was between the principals and other teachers with a rank-order correlation of .60 and the least agreement was between the superintendents and other teachers with a correlation of .38, when self-descriptions were excluded. The difference between the highest and lowest correlation was not significant.

The most agreement on Initiating Structure was between the principals and other teachers with a rank-order correlation of .63 and the least agreement was between the superintendents and students (when self-descriptions were excluded) with a correlation of .29. The difference between the highest and lowest correlation was significant.

The teacher descriptions of themselves were significantly related only to descriptions by students and showed practically no relationship to descriptions provided by other judges.

The students were the only judges who showed significant agreement with descriptions of leader behavior provided by all other judges.

Conclusions

The most important conclusion was the substantiation of the first hypothesis. When leader behavior (both Consideration and Initiating Structure) was judged to be present to a *greater* than average degree, the teachers were generally effective; when leader behavior of both dimensions was judged to be present to a *less* than average frequency, the teachers were relatively ineffective.

The second hypothesis was substantiated to some extent when the students showed a significant relationship between ratings of effectiveness and scores on both behavior dimensions with the tendency to relate effectiveness more closely to score on Consideration than Initiating Structure.

The third hypothesis was only partly substantiated when principals and superintendents proved a relationship between effectiveness ratings and scores on both leader behavior dimensions. Neither dimension was more closely related than the other to effectiveness and thus the second part of the hypothesis was not verified.

There was no more agreement on certain aspects of what the teacher does in the classroom than there was on how well he teaches in general.

The most striking area of disagreement was between the teachers themselves and the other judges. This was observed both on the ratings of effectiveness and the descriptions of behavior.

The greatest amount of agreement on ratings of effectiveness was between principals and superintendents. It is likely that these judges had the most experience in evaluating teachers. They would have had the most opportunity to understand what made some teachers effective and other ineffective. The greatest amount of disagreement was between superintendents and students. Students would have had less opportunity to develop a frame of reference for evaluating teachers and they would have the least ability to judge teachers. Research has shown that this ability is related to age of children.

On descriptions of behavior it is significant that the students were the only judges who showed some agreement with all other judges including the teachers themselves. They have the most contact with the teacher in the classroom and probably have developed a frame of reference which includes parts of the frames of the other judges.

One of the unexpected results was that the greatest amount of agreement on descriptions of the teachers' leader behavior was between the other teachers and the principals. This was the case on both dimensions. Since other teachers have no opportunity to

observe their fellow teachers at work in the classroom, it was expected that they would show little if any agreement with other judges. In the schools used in this research all of the principals were either full or part time teachers. Thus, the principals might not have had much more opportunity to observe the members of their staff than did other teachers. However, the point should be emphasized that principals appear not to be able to show any more agreement with students, who observe every day the teacher's behavior, than they do with other teachers who never observe the teacher's classroom behavior.

The fact that administrators showed significantly more agreement with students on Consideration than Initiating Structure might be important. It seems that an administrator could more easily infer a teacher's human relations behavior (Consideration) from general contact than he could infer the teacher's behavior in attempting to accomplish goals (Initiating Structure). A teacher's relationship and means of getting along with others in staff and professional groups might be similar to his human relations behavior with students in the classroom, but his behavior in getting things done in the classroom does not seem to be as similar as the behavior he exhibits in adult groups.

With regard to the TLBDQ one must conclude that the present instrument should not be used with any one set of judges, but that all the viewpoints used in this study should be considered.

Implications

The conclusion that both Consideration and Initiating Structure are related to effective teaching has implications for educators who are interested in helping teachers to improve. This would be true for broad areas of supervision such as in-service education programs and work with individual teachers.

Since scores on the behavior dimensions did not show perfect relationship with ratings of effectiveness, there are not doubt other factors that are important. The teacher's technical knowledge of his subject matter and his behavior resulting from the situational factors (such as the community and ability of the class) would also be important. Neglect of one or more of these factors will prevent a complete analysis and a solution of a particular problem.

There needs to be more communication between administrators and teachers since the teachers either have no clear idea of what the administrators think of their work, or do not accept the opinion of the administrators.

Administrators could obtain a more complete picture of the teacher through an interchange of their opinions and through closer

observation of the student-teacher relationship especially in the area of Initiating Structure.

If leader behavior is stable, there are implications for selection of candidates for teacher training. If leader behavior can be modified, there are implications for courses on the programs of teacher training colleges. Undergraduate courses for teachers in classroom administration might synthesize the teacher's knowledge of subject matter, his understanding of the situation with regard to pupils (psychology) and with regard to the community and groups (sociology), and the behavior needed to be an effective leader.

REFERENCES

1. Haplin, A. W. "The Behavior of Leaders," *Educational Leadership,* 14: 172-176, December, 1956.
2. Hemphill, J. K., and A. E. Coons (editor). *Leader Behavior: Its Description and Measurement,* Research Monograph Number 88. Columbus, Ohio: Bureau of Business Research, The Ohio State University, 1957.
3. Mitzel, H. E. *A Behavioral Approach to the Assessment of Teacher Effectiveness,* Monograph. New York: Office of Research and Evaluation, Division of Teacher Education, College of the City of New York, February, 1957 (mimeographed).

THE VICE-PRINCIPAL

PRESENT STATUS IN DIVISIONAL AND COUNTY SCHOOLS IN ALBERTA

FREDERICK ENNS AND A. W. REEVES
Faculty of Education

The Setting

Rapidly expanding school systems and greatly increased enrolments are making necessary a considerable increase in the number of principals trained for educational administration. Further expansion and further demand for administrative personnel seem inevitable. "While for some time new positions can be filled by drawing competent people from neighboring, well established and stable systems, a school system must eventually evolve its own program of developing administrative talent."[1] Thus the preparation of competent persons to assume positions of leadership has become a problem of some urgency.

Further, the changing role of the principal—his assuming a share of the supervision of instruction in addition to the other responsibilities of school management—makes it imperative that more adequate assistance be provided. As an administrative position, the vice-principalship offers one approach to solving the problem. Properly conceived and implemented, it can give the assistance required by the principal, and at the same time, provide training experiences for potential leaders.

Purpose of the Study

Because there is little or no consensus of the status of the vice-principal in the school, and because there is no clear statement of his duties and responsibilities, this study was intended to examine in some detail various aspects of the position to discover prevailing practices. Under circumstances of limited responsibility and narrow experience it seemed unlikely that vice-principals were being fitted adequately for promotion or that they were making a significant contribution to the administration of schools. Hence, the basic hypothesis of the study was that, though the vice-principalship offers opportunity to select and train potential educational leaders, this opportunity is not being fully exploited.

---

[1]K. F. Prueter, "Executive Development Within a School System", *Canadian Education*, 12:30-39, March, 1957.

Research Design

Because city school systems are more mature and stable in both organization and staff, it was assumed that they were developing policies different from those of non-urban areas. The study was therefore limited to the school divisions, counties, and towns of the province. Data were collected by means of questionnaires constructed by the investigator and distributed to school superintendents, principals and vice-principals. Schools were selected to give representation to all areas of the province and to all types of schools, from small ones of eight to eleven rooms to large ones of over twenty rooms. Fifty-seven superintendents, one hundred and eight principals, and ninety-nine vice-principals completed questionnaires giving a return of more than 80 per cent. Questionnaires from the three groups were compiled and compared on the basis of geographic distribution and size of school to establish general practices and trends.

Findings

Personal Profile of Vice-Principals

The majority of the vice-principals studied were married men averaging forty-two years of age. Most were teaching in schools offering instruction in all grades from one to twelve. Their average salary was slightly over $6,000 per year. Few belonged to professional organizations other than the Alberta Teachers' Association and their own principals' and vice-principals' association. Most vice-principals had had teaching experience at all grade levels, but following appointment they had taught mainly at the senior high school level. Mean teaching experience was 17.2 years, most of which had been in Alberta schools.

Approximately half the group had been appointed to the vice-principalship before completing ten years of teaching, but 16 per cent had been promoted only after twenty or more years. Almost one-half the group had at some time been principals of schools. Although these had usually been small schools, some vice-principals had left principalships of large schools to assume their present duties.

Ten per cent of the group had only one year of teacher education, 34.3 per cent had less than four years and 65 per cent had four years or more. Two per cent held master's degrees, 9 per cent held two bachelor's degrees, 50.5 per cent held single bachelor's degrees and 38.4 per cent held no degrees. More than half of these vice-principals were working for higher qualifications, most frequently the B.Ed. or M.Ed. degrees. Approximately 67 per cent of the group now held the professional certificate, whereas at the time of appointment to the position this percentage had been fifty, and only 47 per cent

had had degrees. Few of the vice-principals had had formal training in educational administration or supervision.

Promotion to the Vice-Principalship

The majority of the vice-principals studied had been promoted to their positions from within the staff of the school in which they now worked; the group next in size came from other schools in the same division or county; and the smallest group, fewer than 20 per cent came from outside the school system. The larger the school, the greater was the probability of the vice-principal's having been selected from its staff.

Mobility of vice-principals was low. Few had moved to other schools to take up similar positions following appointment. However, 11 per cent had come to their present positions directly from principalships. Though most vice-principals were selected from teaching staffs, high school teachers were promoted much more frequently than were others.

The two greatest attractions of the vice-principalship, causing teachers to seek promotion to it, were the additional salary offered and the prestige attached to the position. Opportunity to receive training in preparation for further advancement was rated fourth in a list of ten items, while the possibility of exercising administrative talent was rated seventh by vice-principals.

In the opinion of vice-principals, the ability and qualification of the teacher to teach at the high school level was the factor which boards considered to be most important in making an appointment. They also maintained that promotion to the vice-principalship was frequently made on the basis of seniority and was used as a device for rewarding good service in the past. The demonstrated administrative ability of the teacher was thought to be of secondary importance. Principals bore out this generalization in that they rated the importance of these factors in essentially the same order as did vice-principals. Further substantiation came from superintendents who indicated that boards had indeed at times used the vice-principalship as a means by which to recognize good service, or to attract qualified personnel to high school positions which were difficult to fill. Superintendents also reported that, generally, boards did not have stated policies for the selection and promotion of teachers to vice-principalships. When vacancies occurred, each was considered as an individual instance and promotions were made on an individual basis. Boards questioned the administrative importance of vice-principals in schools of fewer than twelve rooms.

Duties of Vice-Principals

A check-list of forty items naming possible duties was submitted to vice-principals who were asked to check those for which they were completely or almost completely responsible. They were also asked to add duties not included in the list but for which they were responsible. No item was checked or listed by more than 50 per cent of the respondents, and most by fewer than 25 per cent.

The six most commonly checked duties, in order of frequency, were the following:

1. distribution of instructional supplies;
2. directing the school sports program;
3. ordering and requisitioning supplies and equipment;
4. supervising pupils at school, particularly at noon;
5. directing the textbook rental plan for the school;
6. completing attendance forms for the school.

Other duties ranged from ringing bells, and directing the audio-visual program, to supervising students' union activities.

A wide variety of tasks, often of a routine nature, was reported but no general pattern of duties emerged. Neither the vice-principals of large schools nor those of smaller schools were being delegated responsibility for special areas of the school program. No large percentage of vice-principals was held responsible for any particular pattern of duties. In other words, there did not seem to be general administrative agreement or policy on what a vice-principal should do in a school, either to help in its operation or to provide training experiences for him.

If vice-principals were generally doing routine work and carrying limited responsibility, it was reasonable to expect that the amount of time spent on them would be small. Ordinarily this was the case. More than 50 per cent of the respondents spent six hours or less per week on their extra duties. Only in large schools of more than twenty rooms was the amount significantly higher. Similarly, it was also to be expected that they would seldom act on their own initiative in matters of consequence. This was found to be true in that some 90 per cent of vice-principals stated that they referred most matters to their principals for final decision.

To test further whether duties of vice-principals were such that they required special training or ability, both principals and vice-principals were asked if those duties could be carried out by other staff members. Two-thirds of all vice-principals believed that their work, if equitably distributed, could be done just as well by classroom teachers. Even 50 per cent of the vice-principals of large schools believed this to be true and the percentage increased as the

size of the school decreased. On the whole principals did not state so positively that this could be done, although 40 per cent agreed that it could.

Asked how valuable the vice-principal's assistance was in the operation of the school, 80 per cent of principals rated it as "good" or "excellent". Paradoxically, however, when asked whether this assistance freed them extensively for supervisory work, 73.2 per cent said, "No". Asked further to account for such a situation, principals replied that the vice-principal's lack of time free from teaching was the chief reason for his not being of more help.

How Duties Were Determined

Generally, there was no evidence of system-wide policies for establishing the duties of vice-principals. School systems had defined neither broad areas of responsibility nor routine duties. This was largely accepted as a matter for local decision between principal and vice-principal. Most principals felt that they had adequately defined the vice-principal's duties, though such definition rarely took the form of a written list or outline. On the other hand, vice-principals were not satisfied that their duties had been clearly defined. Less than one-fifth of the group reported knowing specifically at all times what was expected of them. Three-fifths stated that they knew in a general way what was required, while one-fifth said that their assignments had been too vague to permit them to act effectively. This last group stated emphatically that they would like to have a policy which would state in detail the routine duties required of them and outline in broader, more flexible form other general functions.

Payment of Vice-Principals

Most vice-principals were paid salaries on the basis of their academic qualifications and teaching experience with an added allowance based on the number of rooms in the school. Such allowances generally were one-half those allotted to principals. They ranged from $100 in one of the smallest schools to $1,538 in one of the largest, with a median of $525. Interestingly enough, median allowances of vice-principals in schools under twelve rooms were only $100 less than those of vice-principals in school of twenty or more rooms, indicating that ceilings were imposed on bonuses paid in larger schools.

Facilities and Time Available to Vice-Principals

Few vice-principals reported having their own offices. Either they shared the principal's office or worked from classrooms and the school library. Special office facilities for the vice-principal

seemed to be related to the size of the school. Clerical assistance was also rare, but this in itself was to be expected since generally, clerical assistance is not common in divisional and county schools.

If, as principals had indicated earlier, vice-principals did not have sufficient time free from teaching classes, how much time had they, and to what extent was such free time being used to relieve the principal for supervisory work? Approximately 12 per cent of vice-principals reported having no time free of teaching, 34 per cent had from one to five class periods per week, 35.4 per cent from six to ten periods and 17.2 per cent more than ten. Again the amount of "free" time varied directly with the size of the school. The range was from zero to twenty periods per week with a median of six periods.

School organization is frequently such that pupils not taking instruction at a given time are in study rooms under supervision. All vice-principals reported sharing in this type of supervision, using from one to fifteen class periods per week for it. This meant that effective time in the school day during which the vice-principal could release the principal for supervision of instruction was material reduced.

The Vice-Principalship as a Preparation for Educational Leadership

Is the vice-principalship being considered as an intermediate promotion between classroom teaching and the principalship? Vice-principals themselves did not apparently consider it as such. Fewer than 50 per cent of the group studied planned to become principals in the future. Rather, they considered the position as a terminal one. A number of them had even come to the vice-principalship via the principalship. Nor had most of the principals of this study proceeded to their positions through the vice-principalship. Only 50 per cent had ever held the position and only 36 per cent had moved into principalships directly from vice-principalships. Rather than having come through the vice-principalship, principals had come to their present positions mainly from principalships of smaller schools and from teaching positions on high school staffs. Most principals had come from staffs of relatively small schools offering instruction in all grades. Thus, although experience as a vice-principal was considered desirable, it had not been considered necessary for promotion to the principalship. Nor, apparently, had vice-principals of larger schools chosen to become principals of smaller ones.

Adequacy of the Vice-Principal's Experience in Training Him For the Principalship

If the vice-principal were planning to seek promotion to the principalship, were the experiences he was getting in the present position such that he was being properly prepared for advancement? Principals who had been vice-principals were divided in their evaluation of their own training experiences. Approximately one-third of them rated it as only "fair" or "poor". Of vice-principals presently in such positions, only 17 per cent rated their experiences as "very good" training for promotion, while 27 per cent rated them as "inadequate".

Those who rated their experiences as inadequate gave the following as their chief reasons:

1. too little actual experience in the duties of the principal was afforded;
2. the system lacked a planned program of in-service training;
3. the lack of scheduled time prevented experience with various phases of school operation.

Principals themselves, though aware of the need for assisting their vice-principals to prepare for promotion, apparently were not helping to provide the necessary program for such preparation to take place. Neither principals, superintendents nor vice-principals gave indication that any school system was conducting a specifically planned program of training for people interested in promotion to principalships.

What might be done? Principals and vice-principals had already indicated the need for increased time free of teaching, but this alone without adequate planning for the use of such time would be an ineffectual approach. To obtain a measure of opinion from vice-principals, they were asked to select and rate in order of importance to them, the three suggestions in a list of seven types of activity which they considered most useful for inclusion in an in-service program.

Actual experience with specifically assigned administrative duties in their own schools was considered of first importance. Workshops with principals and superintendents, in which matters of administrative function could be studied, were rated second in importance. Finally, study of university courses in administration and supervision would round out the in-service program. Vice-principals suggested further that the first phase of the program could be planned by the local principals' association, and the second by principals' associations and superintendents on a regional basis. The approach suggests a number of fruitful possibilities. In meet-

ing to plan and conduct such activities the entire group would need to re-examine the roles of all administrative personnel in the schools and thereby gain a deeper insight into the whole matter of school administration. Beginning in the local situation and extending to the regional area, such a project might be expected to improve school operation in general, as well as to provide for more adequate training for those vice-principals wishing to prepare for promotion.

Summary and Conclusions

As an administrative position or as a training for educational leadership, the vice-principalship as revealed in this study, is relatively unimportant. There seems to be little insight into its potential usefulness in the school. Although there is evident agreement that a new appraisal is necessary, no organized approach is being planned.

Vice-principals, especially in smaller schools, were being appointed more because of the requirements of the School Act than because of the needs of the school. Once appointed, they were not being assigned significant duties other than teaching, and there was little preparation for further promotion. Under present organization the position permitted boards to pay attractive bonuses to good teachers who were qualified to teach high school grades. In essence this practice represented a type of merit pay plan used to hold good teachers and to attract others in a time of shortage of qualified personnel.

Duties assigned were usually of a routine nature which, in schools too small to have vice-principals, are shared by the whole staff. Because such duties are generally recognized to be of low-level significance, little time free of teaching was being made available for their execution. In effect, the position was a sort of repository for those tasks disclaimed by other teachers and the principal simply because the vice-principal was there and was being paid to do something. On the one hand, if the vice-principal were a good teacher, these tasks interfered with his classroom effectiveness. On the other hand, if his talents were for administration, his time was being wasted in routine details. There was need for clarification of the respective roles of the principal, vice-principal and classroom teacher. Lack of organization and definition of the vice-principalship resulted in obvious and immediate tasks being assigned to the person most readily available without regard to the long-term purposes and basic objectives of the administrative program. The press of day-to-day activities too easily diverted attention, time and energy from the long-range planning and operation essential to the school.

Experience as training for further promotion was rated by vice-principals as being of limited value. They felt that they were not gaining experience in the duties of the principalship, experience which might be made available through a planned inservice program. Such a program developed through the local principals' association, could be extended to regional areas. Locally, a division of labor might be arranged with principals in such away as to insure that, over a three to five year period, the vice-principal might have opportunity to assume full responsibility (over a limited time) for each aspect of the direction of the school. Regionally, vice-principals, principals and superintendents might hold periodic workshops to study the roles of all school personnel to establish proper relationships and clarify functions. This latter project might be thought of as an extension of the Leadership Course for School Principals. The benefits of such a workshop would extend beyond the training of vice-principals.

The position of the vice-principal in the small school raises a number of questions. Although the School Act requires the appointment of a vice-principal when the school reaches eight rooms, the appointment is not always justifiable. Duties are too limited, frequently restricted to tasks of clerical nature. Greater effectiveness might be achieved by giving principals more time for administration and more clerical assistance than at present, rather than by appointing a vice-principal. Duties involving student activities and the sports program can and should be shared by other staff members. The appointment of vice-principals could well be reserved for those schools having significant functions to perform and with time and facilities available for their performance.

Need For Further Study

1. A study is needed to determine the future principalship requirements of Alberta schools. If this were established the proportions of a preservice training program for principals, partly conducted through the vice-principalship, could also be determined.
2. A study is needed to discover the size of school, in terms of its enrolment, in which a viceprincipal serves a significant function. Such a study might also derive possible internal organization patterns for schools of various sizes, indicating the need for various types of personnel, both professional and clerical.

Recommendations

1. That a complete reassessment of the vice-principalship be made by administrators in the light of its purposes and need in the school.
2. That there be a clear definition of the duties of the vice-principal and the experiences desirable for him to have.
3. That school systems plan and organize in-service programs, training vice-principals for administrative competence and educational leadership.
4. That teachers to be promoted to vice-principalships be carefully selected, keeping in mind further promotion to the principalship.
5. That under these conditions, experience as vice-principal be one of the conditions for promotion to the principalship.

DEMOGRAPHIC AND ECONOMIC CHANGES

The Impact of Demographic and Economic Changes In Rural Alberta on the Financing of Education

HAROLD J. UHLMAN
Assistant Superintendent
Sturgeon School Division

Alberta, during its short history as a province, has experienced far-reaching demographic and economic changes. One of the results has been a broadening of the needs for education throughout the province. In rural areas this has called for a complete reorganization of educational facilities, since the one room school proved inadequate to meet the needs of rural children; problems of finance also made reorganization inevitable.

Rural reorganization has produced many changes. It has involved larger administrative units, expanded attendance areas, pupil conveyance, a complex system of grants, and other measures designed to improve the quality of instruction and to equalize the financial burden. The whole process has solved many problems; also created some new ones.

I. The Problem

It was the purpose of the study (6) to examine the structure of rural education in Alberta as affected by selected demographic and eeconomic trends acting through time, and to assess the financial implications.

Specific Problem Areas

The problem was approached through an investigation of the following questions:

1. What has been of significance to education in the developmental pattern of rural local government in Alberta?

2. What have been the demographic changes of import to education in rural Alberta during the past three decades?

3. What changes in the organizational pattern of farming during the past twenty-five years have been of significance to education?

4. What economic influences during the past two decades have been of significance to rural education?

5. What have been the significant trends in the financing of rural education during the past twenty-five years?

6. Of what significance for the future is the changing pattern of rural education in Alberta?

7. What will be the impact of present economic and demographic trends in rural Alberta upon the financing of education in the decade ahead?

Delimitation of the Problem

Geographical delimitation. Because of the differences which exist in the organization of education among the Canadian provinces, and in consideration of the availability of detailed data, the analysis of the problem was confined to rural Alberta. As a result, all findings apply specifically to Alberta and only indirectly to Canada as a whole.

Delimitation of the educational task. Only that portion of the educational task that falls within the sphere of public education in the schools was included in the study. Provision for university and other post-school training has always presented a serious problem in rural areas. However, this phase of the problem was excluded from the study, as was the problem involved in providing educational services for handicapped and gifted children.

Delimitation of financial responsibility. Despite its importance, no treatment was given in the study to the question of federal support to education. Although various geographical, economic, and demographic factors have caused grave inequities in educational opportunities across Canada, the investigation of the problem was kept within its present constitutional limits.

Definition of Terms

Demographic trends. The definition of demography as "the statistical analysis and description of population aggregates, with reference to distribution, vital statistics, age, sex, and civil status, either at a given time or over time" was accepted for the study. (4)

The educational task. The short term task of rural education was defined as that of raising the level of educational opportunity in rural areas to the level already attained in larger urban areas. This definition made possible certain comparisons and contrasts that could hardly have been made in terms of an "ideal" definition of the task.

The educational problem. The word problem was interpreted as "the perception of a task held at a given time by significant members of an organization." (1) The present problem in rural education was perceived, not primarily as one of interpreting the task of the school in terms of facilities, services and programs of study, but one of providing the funds necessary to maintain the present level of progress and to move toward a further closing of the gap in educational opportunity between rural and urban Alberta. This

interpretation of the problem would seem to be in line with "the perception of the task" held by "significant members" of local and provincial educative agencies. (3)

Educational load. In its simplest form educational load is "the relative number of children that must be given an education." (2) In this study the term was defined as the number of children to be educated in relation to selected demographic, economic, and financial statistics. This made possible the use of a common denominator for the reduction of data to meaningful terms for purposes of comparison.

Rural population. In Canada the classification for rural population adopted in 1951 for census purposes was the one used in this study. It includes the "population residing outside cities, towns, and villages of 1,000 or more, whether or not incorporated, and exclusive of census metropolitan areas." (5)

Rural non-farm population. The definition adopted included "all persons living in incorporated places of 1,000 or less, and all persons living in the open country on tracts of land not definable as farms. (5)

II. The Method

Sources of Data

Data on population changes, number and size of farms, farm income and expenditure, and farm mechanization were drawn from census returns published by the Bureau of Statistics, Ottawa. These reports were available for the years 1931, 1936, 1941, 1946, 1951 and 1956.

Annual data on general expenditures for education and other services, school enrolments, taxation assessment figures, provincial grants, operational, instructional, conveyance, and capital costs, along with debt charges and debenture purchases, were obtained from departmental reports of the Government of Alberta and from federal government statistics.

Treatment of Data

Pertinent historical data on the evolution of the structure of local government and the development of an educational system in rural Alberta were abstracted as a framework within which to assess and interpret quantitative data. Brief treatment was also given to the growth of the rural tax structure and the development of provincial grants. These served to place present provincial-municipal relationships in their proper perspective.

For purposes of cost comparison the year 1951 was selected as a "base year" and all data were converted to a common base.* It

*Index: 1951=100.

was thus possible to examine relative changes as well as actual cost changes.

Organization of Data

Since a rather wide range of data pertaining to various aspects of rural education has been given treatment in the study, the brief chapter by chapter outline which follows will be useful to those interested in one or more phases of the general problem.

Chapter II provides a sketch of the development of rural municipal and school administrative units in Alberta, together with brief treatment of the rural tax base and an analysis of the development of provincial aid.

Chapter III treats the nature and extent of general population and school population trends, as well as shifts in the number, composition, and distribution of the labour force, and interprets these trends in the light of their impact upon the educational load and upon the needs of education.

Chapter IV analyses the development of farm mechanization and its effect upon farm size, pattern of residence, and land usage: it interprets the impact upon educational needs and services.

Chapter V evaluates the buoyancy of the farm economy of Alberta in terms of production, prices, and income; also, general trends and periodical fluctuations are analyzed in the light of their impact upon the financing of rural education.

Chapter VI gives a brief treatment of provincial and local financing of education in Alberta.

Chapter VII provides an analysis of trends in revenues and expenditures of municipal districts and of rural school divisions (counties) according to their distribution among various services and among the major divisions of school costs.

Chapter VIII deals with the changing needs of education and treats of school accommodations, availability of courses, and numbers and types of instructional personnel at the high school level in rural Alberta.

Chapter IX focuses attention upon the financial impact of the demographic, economic, and financial trends as analyzed in the study, and projects these trends into the future so as to indicate the probable nature and extent of expenditures for education in rural Alberta in the decade ahead.

III. Discussion

Development of Administrative Units

The early patterns of settlement and of school organization in Alberta reflected typical pioneer conditions—small farms, restricted

communication and travel, and the relatively simple educational demands of people who were entrenching themselves in a land of untested agricultural potential. Financial problems were perhaps less complex than they are today. Pioneer farmers were largely self-sufficient, and uncertain markets were offset by low overhead and limited capitalization. Farming communities, depending as they did upon much hand labour, needed and readily absorbed their own increase of unskilled workers. The need for extensive academic or vocational training was not as apparent as it is today. The small school district and the one-room school were adequate for the job at hand—instruction in the three R's.

Although size presented a problem from the first, the small municipal district provided a reasonably effective unit for the administration of local services. Land acreage, being the chief form of wealth, was the logical source of local revenue. The land tax was relatively adequate to the needs of local authorities and had the added virtue of being readily administered. Most expenditures involved only the local community and its residents, most of whom depended upon land as a source of income. Ability to pay was very directly related to the ownership of land.

Demographic and Economic Trends

Nature of origin. Inherent within the early pattern of settlement in Alberta were the seeds of later finincial problems. It was early learned that quarter-sections of land were not all equal in fertility; sub-marginal units failed to provide sufficient returns to support the rather modest financial demands of the pioneer economy. The early abandonment of the quarter-section system of landholding in many parts of Alberta brought with it the first accentuation of school population scatter. The story has been told by dwindling enrolments in rural schools, and of non-operating "tombstone" districts.

Development of trends. Prominent among the trends which have been obvious in rural Alberta during the past few decades have been farm mechanization, reduction in the labour force, increased farm acreages, capitalization, and commercial farming. The accentuation of scatter which has resulted has been paralleled by a steadily increasing need for more and better education.

Pressing financial problems have developed. Rural birth rates, although subject to periodic national influences, have remained relatively high. The rural economy has been unable to absorb the surplus population, and large numbers of rural youth have been forced to migrate. For economic reasons, many farmers who adhered to the early plan of farming became subsistence farmers, and,

as such, have been unable to meet the financial demands placed upon them. At the same time the three R's became inadequate to meet the educational needs of either the young people who remained on the farms or of those who migrated to urban areas, where semi-skills and skills were the keys to satisfying employment. It early became apparent that financial outlays far greater than those required to operate the one-room school would be required if the changing needs of rural education were to be met.

Geographic trends. Paralleling the general trends which have been dominant throughout rural Alberta have been the further accentuations of population scatter in the southern areas of the province, as compared with population expansion in the north. This redistribution of rural population presented a very real problem to local and provincial authorities striving to meet the new demands for education, as expressed in expanded administrative units, larger attendance areas, and inclusion agreements.

Financial inadequacy. Financially the trend became progressively clear—growing evidence of the inadequacy of the land tax. Changes in land usage, not necessarily related to income, generated inequalities in the distribution of the educational load. Accompanying this has been a continuing upward trend in education costs, as local administrative units have attempted to formulate and to carry out effective programs of reorganization. Increasing expenditures for conveyance and annual debt charges have constituted a kind of "operational overhead" that has directed dollars away from the instructional program. Often there has been little relationship between the operational overhead resulting from reorganization and the tax-paying ability of the local administrative units concerned.

It is noteworthy that in spite of vastly increased educational cost, there has been a decline in the proportion of the local tax dollar being expended for education. This has resulted from the increasing demand for additional services, as the standard of living has improved. It has expressed itself in keen competition for tax dollars among the various local services.

Economic status of farming. While expenditures for education and other local services were being increased annually, agriculture was losing its buoyancy. It soon was no longer the major support of the provincial economy. Thus, in addition to inequalities among rural taxing units, in ability to pay, there has been a steady downward trend in the proportion of the net value of production coming from agriculture.

Trends in provincial grants. The unequal distribution of educational costs, in relation to ability to pay, necessitated the develop-

ment of a system of provincial grants which has emphasized the "equalization" factor. The redistribution of provincial monies has been accompanied by a marked upward trend in the total amount of education grants. One of the results has been a steadily increasing proportion of provincial expenditures being devoted to education and a decreasing proportion of local expenditures being so used. To a degree at least, the increased provincial grants to education have represented a substitution of provincial expenditures for local expenditures.

Nature of educational developments. Changes in the pattern of rural education have resulted from efforts to find a satisfactory replacement for a system which early proved inadequate. The sheer cost of reorganizing the physical aspects of rural education, in order to keep the system operating in the face of demographic and economic changes, has accounted for a major portion of increased educational costs during the past two decades. The gravity of these physical problems has caused rural society to concentrate upon the quantitative aspects of education, and consequently to fail to appreciate fully the task of education in modern society.

The present pattern of rural centralizations undoubtedly extends opportunities for rural children far beyond those available in the one-room school. There are some variations in programs, but the programs are seriously restricted both in clientele and in scope. While the achievement of matriculation has been a boon to the academically inclined, many young people who will be absorbed into rural life need greater access to skills, semi-skills, and pre-vocational education in general, as do many of those who migrate cityward.

Future trends. The obvious means of providing an expanded program would be through further centralization and the pooling of student bodies, but the limitations of this approach are readily apparent. The restricted potential of further "inclusions", the relatively static total of rural population, and the continued development of scatter make major extensions of the present pattern impractical. The implication is that, if prohibitive costs are to be avoided, a new form of organization must be evolved.

There are not many rural communities having either the student base or the financial resources to diversify and extend the local program of education to the degree required. There is now "free" public education within the rather restricted limits imposed by place of residence and within the confines of the grades and subjects taught in particular schools.

One of the "shocking" financial implications of the study is that an educational system has been developed which is inadequate to

the needs, and indeed may not be favorable to the modifications required.

Responsibility for education. The responsibilities of rural education authorities are broader than the provision of an adequate education for young people who join the farm labour force. Mobility, surpluses in the rural population, decrease in the employment opportunities for unskilled workers, and the growth of employment opportunities in urban centres all underscore the desirability of upgrading rural education. If surplus rural youth are to be employable, they must have access to a kind of education that is adequate for urban society. There can no longer be a rural-urban distinction; the products of the school should be interchangeable.

IV. Conclusions

The study supports the following tentative conclusions:

1. The traditional rural-urban differentiations, as separate and discrete parts of society in Alberta, must be abandoned, particularly with regard to education.

2. The education of rural youth must be upgraded, whether these young people are being prepared for either rural or urban occupations.

3. The possibilities of meeting the educational needs of youth within the present organization, curriculum, and financial structure of rural education are slight. Adequacy within the present organizational pattern could well be financially prohibitive.

4. New ways and means of improving the quality and scope of rural education must be sought within the clearly defined demographic qualities of rural Alberta.

5. Financial schemes of the future must distribute the costs of education, even more fully than at present, beyond any locale.

V. Further Research

There are three rather clearly defined areas for further research suggested by the study—the administration of rural education, public relations, and finance. The following are indicative of the types of problems requiring answers:

1. Administration—What administrative arrangements will make more effective the present program of rural education? What will be the nature and extent of state participation required to achieve the goals of rural education? How can the rigidity that is inherent in state planning be minimized? Under what conditions should the state assume greater responsibility for education?

2. Public Relations—What are the basic qualities of effective education for rural Alberta? How can public understandings of

these qualities be achieved? What are effective means of securing active and constructive participation by the public in educational planning?

3. Educational Finance—What financial arrangements will facilitate the extension of educational facilities to rural areas? How can the costs of rural education be most effectively shared? What additional sources of revenue could be made available to rural municipalities? What are the effective means of securing for education maximum benefits from the land tax? How can industrial taxation be most beneficial to rural education? What is a reasonable relationship between the division of costs for education and the sharing of administrative responsibilty?

REFERENCES

1. Campbell, Roald F. and Gregg, Russell T. (ed.). *Administrative Behaviour in Education.* New York: Harper and Brothers, 1957, p. 162.
2. Canadian Teachers' Federation. Information Bulletin 58-1, "Educational Finance in Canada." Ottawa: Research Division, Canadian Teachers' Federation, 1958, p. 11.
3. Collins, Cecil P. "The Role of the Provincially Appointed Superintendent of Schools in Larger Units of Administration in Canada." Unpublished doctoral thesis, University of Alberta, Edmonton, 1958, p. 72.
4. Fairchild, Henry P. (ed.). *Dictionary of Sociology.* New York: Philosophical Society, 1944, p. 90.
5. Government of Canada, Bureau of Statictics. *Census of Canada,* 1951, "Introduction to Population Statistics." Ottawa: King's Printer, 1951, p. iii.
6. Uhlman, Harold J. "A Study of the Impact of Demographic and Economic Changes in Rural Alberta on the Financing of Education." Unpublished doctoral thesis, University of Alberta, Edmonton, 1959.

THE PREDICTION OF FRESHMAN SUCCESS IN THE UNIVERSITY OF ALBERTA FROM GRADE XII DEPARTMENTAL RESULTS*

DONALD B. BLACK
Division of Educational Psychology
Faculty of Education, University of Alberta

The multiple differential grade prediction technique has not been widely used in universities and colleges. However, the advent of the high speed electronic computer has now made the implementation of this technique as feasible as the use of multiple test score battery computed as an average alone. Perhaps the two foremost exponents of this technique are Dvorak (1954) and Horst (1959) at the University of Washington. Their conclusions are based on evidence from more than ten years of admissions research and application of the technique. The Washington program can now be found as part of every high school guidance program in that state and has reached such a degree of sophistication that its prediction equations are based on four years of university performance of over seventy-five hundred students who have attended the University of Washington.

Multiple differential grade prediction is a refinement of the so-called actuarial method of prediction whose critics, such as Meehl (1956), have this to say:

> "After reading these studies, it almost looks as if the first rule to follow in trying to predict the subsequent course of a student's or patient's behavior is carefully to avoid talking to him, and the second rule is to avoid thinking about him." (Meehl (1956), p. 263)

Agnell (1959) is a little more impartial when he summarizes both the advantages and limitations of the technique as follows:

> 1. The combination of predictor variables used in all the multiple regression equations would represent the "best" combination from a large pool of possible predictor variables in terms of doing the best job, in general, of predicting success in all of the major college subject areas.
>
> 2. The combination of predictor variables selected also tends to represent that combination from the pool of possible predictors that does the best job of differentially predicting success for the students.
>
> 3. One test battery only is required in order to provide predictive data on each entering freshman in all the major college subject areas.
>
> 4. The total amount of testing time involved in not prohibitive.
>
> 5. Advisors and counselors can be provided at the beginning of the fall semester with actual grade-point average predictions for each entering freshman student in each of the major college subject areas as well as for their over-all college average. These would probably be submitted to the

*This is the last of three articles reporting the findings of the Matriculation Study Sub-Committee of the Joint Committee to Coordinate University and High School Curricula.

counselors and advisers in the form of prediction profiles. Accompanying each grade-point average prediction for each subject area would be such data as the following:

a. The standard error of each estimate.
b. The mathematical odds of achieving a "C" average or better.
c. The mathematical odds of being in the upper 50 per cent of the group in the subject area.

6. Work sheets can be developed for the students in which predictions for various majors being considered and their prerequisite courses could be plotted. Comparisons could then be made of the plotted data in the process of selecting a realistic major field of study.

7. All of the mathematical odds cited in item 5 above are determined by comparing the predicted grade-point averages with the actual achieved college grade-point averages in all the subject areas for all the entering freshmen and all are cross-validated on succeeding freshmen classes. Knowing the actual odds as well as the standard errors of the grade-point average predictions eliminates the "best guess-work" involved in determining the probabilities of success by subjective interpretations of raw data. This would be especially valuable for the relatively inexperienced counsellors and faculty advisers.

* * * * * * * * *

Obviously, this suggested program of multiple absolute and multiple differential prediction is not perfect inasmuch as none of the multiple correlational estimates would be perfect and as there are fairly well-known limiting factors involved in attempting to predict college academic success such as the following:

1. The dynamic and complex nature of the human organism obviously makes perfect prediction a virtual impossibility.

2. The limitations of the criterion employed for each subject area—the criterion of letter grades—limits the multiple correlational estimates differentially. However, it is the criterion which must, in most cases, be employed because it is the criterion generally employed by the administration and faculty of most colleges and universities in evaluating their students. The variance in reliability of grading practices in an institution and other characteristics of grading practices have obvious effects upon the magnitudes of the multiple correlational estimates.

3. Students must take certain required courses even though their probabilities of success may not be too good. However, a knowledge of the chances of success may, in some cases, serve as an added incentive.

4. It is possible that some students can have good probability of success in certain subject areas but can have no real interest in these subjects.

5. Although the combination of predictor variables derived by the predictor selector system represents the "best" combination from a large pool of possible predictors, still better combinations may be developed through continuing experimentation. (Angell (1959), pp. 421-22)

This study reports the results of applying the technique to thirty freshmen course areas at the University of Alberta. The study sample consisted of 529 students who had participated in the May, 1956, Department of Education Grade XII Special Testing Program, and who came to the University in the fall of that year. In addition, these students had the required Departmental examination prerequisites for admission to a baccalaureate program, and also participated in the special freshman testing program conducted by the University of Alberta Student Advisory Services.

The first task of the study was to determine those predictor variables that would be most economical for predicting freshman success. First, the zero order correlation coefficients were determined for each of the predictor and criterion variables. The criterion variables represent freshman courses in the various subject fields as listed in the 1956-57 University of Alberta calendar. There are two exceptions. Freshman Average and Engineering Average represent the average of all marks in Engineering or other combination of freshman courses that a student took and which may or may not be found among the courses and course area included in this paper. Course area refers specifically to those instances where grades from a variety of different courses in a single field, e.g., Mathematics 5, Mathematics 40, and Mathematics 45, are pooled as a single criterion, Math. 5, 40, 45.

The predictor variables numbering twenty in all were composed of test score data collected from a variety of testing situations. However, to facilitate discussion of these variables they will be grouped into six groups as follows:

Group A: College Board Achievement Test scores from the May 1956 Grade XII Special Testing Program (See Evenson and Smith, 1957, 1958); Black (1959a).

Group B: Grade XII Departmental scores: English 30, Social Studies 30, average of Mathematics 30 and/or 31 (Mathematics Average), average of Chemistry 30 and/or Physics 30 and/or Biology 32 (Science Average), and average of French 30 and/or French 31, and/or German 30, and/or Latin 30 and/or Spanish 30 (Foreign Language Average). It is noted that most students took only one Grade XII foreign language of which French was the major choice. The two science courses chosen most frequently were Chemistry 30 and Physics 30.

Group C: Grade XII Departmental scores in English 30, Social Studies 30, Foreign Language Average, Mathematics 30, 31, Chemistry 30 and Physics 30.

Group D: Cooperative School and College Ability Test (SCAT): Level 1 Verbal (V) and Quantitative (Q) scores, Cooperative English Test: Reading and Mechanics of Expression Tests scores.

Group E: Cooperative American Council on Educational Psychological Examination (ACE) Linguistic (L) and Mathematics (M) scores, College Entrance Examination Board (CEEB) Scholastic Aptitude Test (SAT) Verbal and Mathematics Test scores, and CEEB Advanced Mathematics Test score.

Group F: Grade IX Departmental Examination scores: General Test, Science, Mathematics, Social Studies A and B, Literature and

Reading. For a detailed discussion of these particular variables, see Black (1959b).

All data for the 529 students used in this study were placed on IBM cards and these data processed on the University of Washington IBM 650 using Washington IBM 650 programs by Dvorak and Wright (1958) and Lunneberg (1957).*

The results of the analysis of the data are presented in the following tables. Table I presents the zero order correlation coefficients between the various predictor and criterion variables. Table II presents the multiple correlation coefficients (R_c) resulting from the use of a variety of predictor variables to predict scores in the freshmen criterion. Not included in this latter analysis are the results when various CEEB Achievement Test scores were substituted singly for the corresponding Department Examination score. It will suffice for this paper to note that in no instance did the CEEB scores prove to be significantly better predictor variables than the equivalent Departmental scores. It should also be noted that the CEEB Achievement Tests were at a disadvantage in such comparisons inasmuch as they were not evaluated as a battery.

The Horst iteration method (1954, 1955) was used to determine the multiple correlation coefficients presented in Table II. One characteristic of this method is that it selects only those predictor variables in an assigned weighting for each so as to produce the largest multiple correlation coefficient possible between the criterion and the predictor variables. The addition of other variables to those indicated will serve only to lower the size of the multiple correlation coefficient, and thereby reduce the accuracy of any predictions made using such data. Second, the relative contribution of each predictor variable is based in part on what actually exists, not on what might exist under other conditions. The relative weightings of each predictor variable found reflect the present evaluation pro-

*The Alberta Department of Education, the University of Alberta Registrar's Office and the University Student Advisory Services Office provided the score data for this study. The investigator would like to note especially the assistance of the following in this regard: *Alberta Department of Education*: Mr. A. B. Evenson, Associate Director of Curriculum, and Miss Angela Budnyk, Statistical Assistant; *The University of Alberta*: Mr. A. D. Cairns, Registrar, Mr. H. R. Hawes, Assistant Registrar, and the staff of the Registrar's Office; Dr. A. J. Cook, and the staff of Student Advisory Services.

The investigator would like to acknowledge the assistance of Mr. Graham Stewart, Supervisor and Mr. Walter Hesse, Assistant Supervisor, IBM Room, Alberta Department of Municipal Affairs, who permitted the use of their equipment by the investigator and helped with technical problems in the construction of the data decks. Dr. Don Decker, Director of the University of Washington Computational Center accorded the author full faculty status for machine time priorities. A special tribute must be paid to Drs. August Dvorak and Calvin E. Wright who worked with the investigator during the time he was in Seattle. Dr. Dvorak, besides making all necessary arrangements for the use of the Washington equipment, has taken such a personal interest in this study that he might well be considered with the investigator as an *ex officio* member of the Subcommittee. This interest plus his intimate knowledge of the computer and the technical details of the differential grade prediction technique smoothed many of the perplexing technical details of the analysis of the data.

TABLE I

ZERO-ORDER VALIDITY CORRELATION COEFFICIENTS BETWEEN THIRTY UNIVERSITY FRESHMAN CRITERIA AND TWENTY PREDICTOR VARIABLES

Criterion	N	Predictor Variables																	
		XII Eng. 30	XII S.S. 30	XII Sci. Av.	XII Math. Av.	XII F/L Av.	SCAT V	SCAT Q	Coop. Eng. Mech.	Coop. Eng. Read.	Chem. 30	Phys. 30	Math. 30	Math. 31	CEEB Adv. Math.	ACE L	ACE Q	SAT V	SAT M
C.E. 5	131	.233	.387	.477	.491	.336	.230	.334	.281	.227	.403	.501	.380	.481	.307	.302	.263	.257	.306
C.E. 6	131	-.028	.079	-.036	-.032	-.055	-.052	.053	.057	-.052	-.068	-.003	-.124	.004	-.088	.034	.162	-.012	-.060
Draw. 2	131	.310	.362	.474	.420	.378	.277	.229	.305	.286	.400	.493	.373	.379	.323	.338	.231	.305	.188
Draw. 4	131	.265	.266	.420	.352	.258	.271	.125	.275	.298	.340	.451	.331	.303	.288	.329	.255	.366	.350
E.M. 1	131	.239	.322	.470	.499	.432	.164	.227	.282	.203	.394	.494	.396	.481	.317	.254	.223	.247	.280
Phy. 21	131	.263	.349	.617	.536	.480	.220	.160	.156	.217	.513	.655	.480	.480	.358	.255	.141	.301	.346
Math. 2	131	.267	.393	.584	.649	.515	.232	.229	.242	.234	.482	.623	.559	.599	.411	.341	.205	.258	.346
Chem. 40	131	.289	.445	.675	.556	.481	.270	.225	.241	.225	.619	.638	.431	.546	.426	.363	.148	.298	.269
Eng. Av.	131	.303	.420	.620	.598	.482	.266	.254	.294	.271	.522	.648	.500	.561	.400	.361	.245	.331	.356
Ed. 176	86	.470	.510	.555	.262	.363	.426	.280	.393	.297									
Ed. 180	86	.370	.348	.451	.343	.314	.245	.218	.365	.159									
PE 101	86	.132	.299	.249	.200	.072	.125	.297	.183	.154									
PE 105	86	.318	.408	.570	.254	.336	.245	.268	.313	.121									

TABLE I—*Continued*

Criterion	N	Predictor Variables: XII Eng. 30	XII S.S. 30	XII Sci. Av.	XII Math. Av.	XII F/L Av.	SCAT V	SCAT Q	Coop. Eng. Mech.	Coop. Eng. Read.	Chem. 30	Phys. 30	Math. 30	Math. 31	CEEB Eng.	CEEB Chem.	CEEB Phys.	CEEB Adv. Math.
Chem. 40, 42	*83 — 336	.231	.409	.691	.537	.431	.264	.310	.201	.185	.654					.530		
Phy. 40, 41	*52 — 83	.090	.302	.702	.489	.430	.117	.340	.110	.104		.561					.290	
Math. 1, 3, 5, 40, 45	137	.197	.385	.621	.610	.460	.214	.311	.284	.107			.560					
Math. 5, 40, 45	82	.295	.310	.609	.657	.545	.326	.326	.381	.115			.591	.622				.488
Eng. 2	196	.523	.492	.496	.389	.498	.544	.156	.421	.347					‡.387			
Eng. 5	*84 — 149	.413	.416	.436	.166	.332	.398	.266	.437	.384								
Hist. 8, 10	83	.299	.458	.454	.220	.310	.237	.123	-.047	.256								
French 2	61	.230	.508	.595	.477	.724	.398	.266	.285	.210								
Acct. 1	31	.066	.488	.616	.480	.345	.021	.363	.346	.161								
Com. Law	31	.134	.559	.479	.438	.306	.191	.254	.121	.170								
Econ. 1	67	.163	.548	.588	.450	.430	.213	.241	.243	.119								
Bot. 1, 5	65	.112	.444	.720	.469	.387	.163	.105	.091	.030								
Zoo. 1	*63 — 127	.152	.397	.714	.343	.301	.212	.179	.055	.228	§.652							
Psych. 40	77	.341	.457	.460	.367	.451	.256	.282	.365	.243								
Geol. 1	43	.048	.089	.492	.490	.338	.135	.248	.137	.171								
Geog. 1	46	.187	.431	.568	.378	.370	.272	.178	.053	.336								
Univ. Ave.	529	.227	.425	.632	.500	.434	.234	.276	.235	.192								

‡English 2 and English 5 combined vs. CEEB English (N=84).
*Number in sample for CEEB Achievement Tests.
§Biology 32 rather than Chemistry 30.

TABLE II

MULTIPLE CORRELATION COEFFICIENTS FOR THIRTY UNIVERSITY FRESHMEN CRITERION VARIABLES AND VARIOUS COMBINATIONS OF PREDICTOR VARIABLES

Predictor Variable Group Used		Multiple Correlation Coefficients					A+C+D+E+F
No. of Predictor Variables	N	B 5	C 7	D 4	B+D 9	B+D+F 16	25
Engineering:							
C.E. 5	131	.545	.565	.356	.552	.552	.589
C.E. 6	131	.079	.124	.057	.079	.230	.400
Draw. 2	131	.481	.510	.308	.494	.504	.541
Draw. 4	131	.416	.440	.276	.441	.464	.501
E.M. 1	131	.522	.539	.288	.522	.522	.551
Phy. 21	131	.629	.654	.220	.634	.634	.667
Math. 2	131	.683	.692	.259	.680	.680	.703
Chem. 40	131	.690	.698	.300	.693	.718	.726
Eng. Av.	131	.670	.686	.312	.670	.670	.687
Ed. 176	86	.673		.457	.677	.716	
Ed. 180	86	.543		.356	.543	.583	
P.E. 101	86	.298		.279	.329	.544	
P.E. 105	86	.604		.335	.613	.613	
Chem. 40, 42	336	.698		.360	.698	.704	
Phy. 40, 41	83	.698		.324	.698	.698	
Math. 1, 3, 5, 40, 45	137	.653		.338	.653	.696	
Math. 5, 40, 45	82	.662		.408	.656	.697	
Eng. 2	196	.665		.576	.689	.722	
Eng. 5	149	.543		.484	.608	.613	
Hist. 8, 10	83	.516		.267	.564	.575	
French 2	61	.755		.393	.755	.759	
Acct. 1	31	.655		.337	.716	.741	
Com. Law	31	.604		.180	.632	.713	
Econ. 1	67	.670		.223	.668	.680	
Bot. 1, 5	65	.720		.105	.727	.741	
Zoo. 1	127	.715		.281	.715	.717	
Psych. 40	77	.543		.352	.547	.578	
Geol. 1	43	.526		.336	.614	.670	
Geog. 1	46	.608		.304	.664	.713	
Univ. Ave.	529	.656		.326	.656	.658	

cedures both in the high schools and University only as they relate to the predictor and criterion variables concerned.

Table I with its zero order validity coefficients is best viewed in comparison with the multiple correlation validity coefficients of Table II. For example, the largest single correlation coefficient was found between Grade XII Science Average and University Average (.632). The equivalent multiple correlation coefficients which in-

cluded Grade XII Science Average as one predictor variable raised the coefficient to .658. While this increase in itself cannot be considered to be spectacular, it does serve to show the dominant role of the high school sciences in determining freshman success in the University of Alberta. In keeping with this and referring to Table III, it is noted that of the predictor variables, the Grade XII Science Average (XII Sci X) contributes to over half of the prediction of the University Freshmen Average.

One further point should be noted. Where physical skills are predominant in determining the criterion score, validity coefficients tumble. This is particularly evident in the course C.E. 6 (Survey Field Work) where the input matrix of the academic achievement variables had such low and non-structured factor patterns relating to the criterion that the program for the computer refused to produce a multiple correlation coefficient. This indicated that the best possible relationship was shown by the highest single correlation coefficient. Inasmuch as these are all very low for this criterion, it is evident that academic performance does not contribute to success in this particular course. Since it would be probably just as accurate to guess at the predicted score in this course, it has been dropped from further consideration in this paper.

Table III presents the data for Group B predictor variables from which regression equations can be developed. The reason for choosing this particular group of variables over the others was based on the size of the multiple correlation coefficient obtained against the amount of labor involved in determining a predicted grade. To illustrate this, compare Group B predictor variables (5 in number) to Group A, C, D, E, and F (25 in all) and the multiple correlation coefficients for Engineering Average obtained from each (Table I). With five variables, the R_c is .670; with twenty-five, .687. The added work of calculating this higher coefficient's equation is negated by the small gain in predictive efficiency. Note, too, for the same criterion variables that there is no increase in the size of the R_c for sixteen variables. On the other hand, using the seven Departmental examination scores required for admission to Engineering (Group C) as predictor variables, the multiple correlation coefficient was found to be just as high as when twenty-five predictor variables were used. The five predictor variables of Group B were deemed the best operational combination for all University course areas studied.

The standard error of estimate is given in the right hand column of Table III. This statistic is determined by the variability of the scores in the criterion course and the size of the correlation coefficient. It provides the basis for determining the odds that an achieved score will differ from the predicted score for this course

area. For example, if a University Freshman Average of 70 is predicted, the chances are two in three that the achieved average will fall between 62 and 78. On the other hand, if a score of 50 is predicted, the chances are only nine in one hundred that the student will achieve a mark of 60.9 or better. The mean University Average for the sample in this study was found to be 60.9 and so we could say that the odds were strongly against this student for whom we predicted a freshman average of 50, equalling or exceeding the class average.

TABLE III

MULTIPLE CORRELATION COEFFICIENTS AND RELATIVE BETA WEIGHTS OF FIVE PREDICTOR VARIABLES FOR THIRTY UNIVERSITY FRESHMAN COURSE AREAS

Criterion	N	R_c	Predictors—Grade XII					σ est.
			ENG.	S/S	SCI. X	MATH. X	F/L X	
Engineering:								
C.E. 5	131	.545		.270		.415		10.9
Draw. 2	131	.481		.160	.391			7.7
Draw. 4	131	.416	.106		.375			10.2
E.M. 1	131	.522		.196		.443		13.6
Phy. 21	131	.629			.471	.214		15.7
Math. 2	131	.683		.172	.158	.492		13.0
Chem. 40	131	.690		.150	.462	.198		10.2
Eng. Av.	131	.670		.169	.294	.349		8.0
Ed. 176	86	.673	.352	.137	.427			6.8
Ed. 180	86	.543	.294		.342	.166		7.2
P.E. 101	86	.298		.270		.147		8.0
P.E. 105	86	.604	.237		.534			6.2
Chem. 40, 42	336	.698		.062	.566	.139		10.0
Phy 40, 41	83	.698	–.085		.722			9.9
Math, 1, 3, 5, 40, 45	137	.653	–.112		.400	.348		13.7
Math. 5, 40, 45	82	.662		–.094	.193	.552		13.8
Eng. 2	196	.665	.332	.152	.152	.118	.174	7.9
Eng. 5	149	.543	.291	.141	.389	–.208		14.6
Hist. 8, 10	83	.516		.316	.308			8.1
French 2	61	.755		.211	.158		.540	11.1
Acct. 1	31	.655		.315	.509			9.8
Com. Law	31	.604		.448	.327			7.5
Econ. 1	67	.670	–.152	.431	.446			9.1
Bot. 1, 5	65	.720	–.126		.759			11.5
Zoo. 1	127	.715	–.083		.744			9.4
Psych. 40	77	.543	.110	.234	.165		.248	7.2
Geol. 1	43	.526	–.257		.386	.257		8.5
Geog. 1	46	.608		.288	.483			7.0
Univ. Ave.	529	.656		.120	.425	.154	.087	8.0

Regarding Table III itself, the reader can draw his own conclusions as to the contribution of each of the five variables to the maximum prediction possible by examining the size of the relative beta weight of each variable. Note, for example, in how few areas the foreign language score contributes to the prediction of success and the relative contribution in each case. The noteworthy exception is French 2. English 30 also is marked by varying relationships both positive and negative. Science Average, on the other hand, is a major predictor (along with Mathematics Average, particularly in the physical science subject fields).

The foregoing analysis and interpretation of the data suggest the following conclusions:

1. High relationships were reported for Grade XII predictor variables. In fact, they compare favorably with the highly refined University of Washington eighteen variable predictor battery. The SCAT and Coop English Test scores do not effectively contribute to the prediction of success in freshman University courses. The most effective prediction test battery from a guidance point of view to predict University freshman performance considering economy of time to calculate predicted grades consists of scores in English 30, Social Studits 30, Average Grade XII Science score, Average Mathematics score and average XII foreign language scores.

2. The findings of the study are unanimous in pointing out the differential nature of the Departmental examinations in predicting success in the University. The Grade XII Sciences are by far the major predictors of freshman success while other Departmental scores, notably English and foreign languages add little to indicate freshman success in the University. For example, success in freshman Mathematics is determined by English, Science and Mathematics scores with English scores making a negative contribution. On the other hand, success in History is determined by scores in Social Studies and Science. Zoology scores are determined predominantly by Science scores with English making a small but negative contribution to the prediction. It is interesting to note that the average which forms part of the present University admission practices assumes that all subjects are of equal value in predicting freshman success. The evidence of this study denies this assumption.

The second part of this paper attempts to present the findings of the study in a form that would be of direct use to the high school or university counsellor in helping students select courses compatible with their demonstrated pattern of abilities and, when coupled with an appropriate interest inventory and other personal data, in keeping with their interests. All the information needed to develop the regression equations to predict grades has been presented earlier, as

has the degree of accuracy that can be expected from such predictions. Table IV, then, presents the prediction equations using the five Group B predictor variables for twenty-nine freshman course areas.

TABLE IV

REGRESSION EQUATIONS FOR TWENTY-NINE UNIVERSITY FRESHMAN COURSE AREAS USING FIVE GRADE XII DEPARTMENTAL SCORES AS PREDICTOR VARIABLES

Subject	Eng. 30	S.S. 30	Sci. X	Math. X	F/L X	Constant
Engineering:						
C.E. 5		.334		.499		2.3
Draw. 2		.134	.331			33.2
Draw. 4	.116		.404			32.8
E.M. 1		.297		.652		–6.3
Phy. 21			.910	.398		–33.1
Math. 2		.290	.269	.806		–38.1
Chem. 40		,201	.626	.258		–18.3
Eng. Av.		.174	.305	.349		3.3
Ed. 176	.344	.141	.356			–2.3
Ed. 180	.268		.266	.108		22.6
P.E. 101		.252		.094		46.9
P.E. 105	.196		.377			30.3
Chem. 40, 42		.083	.800	.172		–15.2
Phy. 40, 41	–.110		1.067			–7.5
Math, 1, 3, 5, 40, 45	–.190		.699	.526		–15.1
Math. 5, 40, 45		–.171	.323	8.39		–11.6
Eng. 2	.348	.169	.150	.105	.143	–8.2
Eng. 5	.219	.097	.273	–.117		26.5
Hist. 8, 10		.309	.263			15.7
French 2		.373	.256		.734	–42.1
Acct. 1		.405	.870			–25.9
Com. Law		.417	.404			5.4
Econ. 1	–.170	.542	.538			–7.9
Bot. 1, 5	–.242		1.061			1.2
Zoo. 1	–.110		1.014			–5.7
Psych. 40	.106	.223	.151		.185	12.4
Geol. 1	–.254		.378	.247		40.4
Geog. 1		.267	.417			15.1
Univ. Ave.		.125	.433	.133	.076	7.5

To illustrate their use, take the case of F.L.R., a boy who has the following Grade XII Departmental record: English 30—74; Social Studies 30—57; Mathematics 30—68; Mathematics 31—65; Chemistry 30—57; Physics 30—76; and French 30—58. From this data, his predicted freshman score for each of the twenty-nine freshman course areas was determined. These are summarized in Table V.

TABLE V

PREDICTED FRESHMAN GRADES FOR F.L.R. IN TWENTY-NINE FRESHMAN COURSE AREAS

Course	Predicted Grade	Course	Predicted Grade	Course	Predicted Grade
				Hist. 8, 10	51
C.E. 5	55	Ed. 176	55	French 2	39
Draw. 2	63	Ed. 180	67	Acct. 1	55
Draw. 4	68	P.E. 101	68	Com. Law	56
E.M. 1	54	P.E. 105	70	Econ. 1	46
Phy. 21	51	Chem. 40, 42	55	Bot. 1, 5	54
Math. 2	50	Phy. 40, 41	56	Zoo. 1	54
Chem. 40	52	Math, 1, 3, 5,		Psych. 40	54
Eng. Ave.	57	40, 45	53	Geol. 1	63
		Math. 5, 40, 45	57	Geog. 1	58
		Eng. 2	53	Univ. Ave.	57
		Eng. 5	59		

The predicted scores from Table V when considered with the standard error of estimate for each course area from Table III, presents a formidable problem in interpretation for the counsellor whose psychometrics background might in no sense be adequate, and they would certainly present a bewildering array of figures and ranges of predicted scores to the student concerned. To facilitate interpretation of predicted scores, a profile chart based on the chances a student would have to achieve a passing grade and determined from the data of this study, has been developed (Figure 1). The predictions of success are based on the probability that a student will achieve a passing grade (50%) in the freshman subject area concerned. Five degrees of success are used:

(a) *Very Doubtful,* when the odds are only one in eight or less that the student will achieve a passing grade.

(b) *Doubtful,* when the odds of success in achieving a passing grade lie between one chance in eight and one chance in three.

(c) *Risky,* when the chances of achieving a passing grade lie between one chance in three and two chances in three.

(d) *Fair,* when the chances of achieving a passing grade lie between two chances in three and seven chances in eight.

(e) *Good,* when the odds are better than seven in eight that the student will achieve a passing grade.

The predicted scores for student F.L.R. from Table V have been plotted on the University Freshman Success Prediction Profile presented in Figure 1.

UNIVERSITY FRESHMAN SUCCESS PREDICTION PROFILE

Chances of Receiving a Passing Grade (50%)

COURSE	VERY DOUBTFUL	DOUBTFUL	RISKY	FAIR	GOOD
CE 5	37 and below	38 - 45	46 - 54	55 - 62	63 and above
DRAW 2	41 " "	42 - 46	47 - 53	54 - 58	59 " "
DRAW 4	38 " "	39 - 45	46 - 54	55 - 61	62 " "
EM 1	34 " "	35 - 44	45 - 55	56 - 65	66 " "
PHY 21	31 " "	32 - 43	44 - 56	57 - 68	69 " "
MATH 2	34 " "	35 - 44	45 - 55	56 - 65	66 " "
CHEM 40	38 " "	39 - 45	46 - 54	55 - 61	62 " "
ENG. AVE.	40 " "	41 - 46	47 - 53	54 - 59	60 " "
ED. 176	42 " "	43 - 47	48 - 52	53 - 57	58 " "
ED. 180	41 " "	42 - 46	47 - 53	54 - 58	59 " "
P.E. 101	40 " "	41 - 46	47 - 53	54 - 59	60 " "
P.E. 105	42 " "	43 - 47	48 - 52	53 - 57	58 " "
CHEM 40,42	38 " "	39 - 45	46 - 54	55 - 61	62 " "
PHY 40,41	38 " "	39 - 45	46 - 54	55 - 61	62 " "
MATH 1,3,5,40,45	34 " "	35 - 44	45 - 55	56 - 65	66 " "
MATH 5,40,45	34 " "	35 - 44	45 - 55	56 - 65	66 " "
ENG 2	40 " "	41 - 46	47 - 53	54 - 59	60 " "
ENG 5	33 " "	34 - 43	44 - 56	57 - 66	67 " "
HIST 8, 10	40 " "	41 - 46	47 - 53	54 - 59	60 " "
FRENCH 2	37 " "	38 - 45	46 - 54	55 - 62	63 " "
ACCT 1	38 " "	39 - 45	46 - 54	55 - 61	62 " "
COM LAW	41 " "	42 - 46	47 - 53	54 - 58	59 " "
ECON 1	39 " "	40 - 46	47 - 53	54 - 60	61 " "
BOT 1,5	36 " "	37 - 45	46 - 54	55 - 63	64 " "
ZOO 1	39 " "	40 - 45	46 - 54	55 - 60	61 " "
PSYCH 40	41 " "	42 - 46	47 - 53	54 - 58	59 " "
GEOL 1	40 " "	41 - 46	47 - 53	54 - 59	60 " "
GEOG 1	41 " "	42 - 46	47 - 53	54 - 58	59 " "
UNIV. AVE.	40 " "	41 - 46	47 - 53	54 - 59	60 " "

FIGURE I: University Freshman Success Prediction Profile for Student F.L.R.

From this chart, it can be observed that on the basis of students who have been admitted to the University of Alberta baccalaureate programs with Grade XII records like F.L.R., he will have to work diligently to achieve passing grades in most areas. It seems apparent that F.L.R. should avoid French 2 and Economics 1 as first year courses as his chances of success are least in these areas. Excellent prospects are evident in Engineering courses, Drawing 2 and 4, Education 180, Physical Education 101 and 105, and in Geology 1. Less spectacular but nonetheless good chances of achieving a passing grade are held in Civil Engineering 5, Engineering Average, (a predicted average of 57), Education 176, Chemistry 40, 42, Physics 40, 41, Mathematics 5, 40, 45, English 5, and Accounting 1, Commercial Law, Psychology 40, Geography. The chances lie between two in three and seven in eight that he will achieve a passing grade at the end of his freshman year in University. Predictions in other courses indicate scores which could equally be either above or below the passing mark of 50. The choice of a course pattern predominantly in these latter areas could have disasterous results.

Because of his pattern of predicted success, Student F.L.R. might do well to consider either Education in a Math-Science pattern, or a Mathematics- Science (Geology, Physics, Chemistry, Geography) pattern in a B.Sc. program. A Bachelor of Commerce program might be worthy of consideration although the predicted result of Economics 1 would discourage exclusive consideration in this area. Discouraging a degree program in Arts (Psychology) and to a lesser extent one in Science is the possibility of difficulty with the required foreign language course (French 2) but meeting this reqirement could be deferred to a later year.

As it turned out, the student in question chose to enter First Year Engineering. His record was as follows: C.E. 5—56; Drawing 2—58; Drawing 4—58; E.M. 1—41; Chem. 40—45; Physics 21—54; Mathematics 2—34; and Engineering Average—51. It is noted that the student in question ran into difficulty on the four courses where the chances of achieving a passing grade were classed as *Risky* and in which he failed three out of the four attempted.

It seems that the Prediction Profile would have two uses in the above case. First, it would point out to the student those areas in which success is likely to be more readily achieved, and those areas where the chances of obtaining passing grades can only be achieved by sustained and diligent effort. There is every reason to expect that a student who begins his university experience on a successful note will continue to be successful throughout his program. Secondly, there is the guidance value of the profile for counselling. The profile is based on data from conditions as they exist in the University and takes into account both the student's abilities and the marking and teaching characteristics of the lecturers. A student, then, besides being shown those patterns in which his chances of success are best will also have certain danger areas pointed out to him. For example, in the case of the student in our example, the choice of an Arts program would mean in most cases, a foreign language requirement before a degree would be granted. The student in question, then has two choices if he persists in selecting an Arts pattern. First, he can attempt the foreign language (French 2) requirement in his first year with the knowledge that to pass he will have to work extra hard in this subject and with the further knowledge that others with the same ability pattern as he have not faired well in French 2* before; or second, he could defer his foreign language requirement until his sophomore or junior year. It would be hoped, too, that if the student persists

*It is undoubtedly apparent to most readers that there are other foreign language options as equally acceptable as French offered at most colleges. French 2 was used here as an example because it is the foreign language option chosen most frequently by University of Alberta freshmen.

417470

against odds favoring failure, he will be motivated to better the odds; or if he should fail, rather than leave University, as do many Alberta freshmen failures, he will on the basis of counselling using the profile, reassess his interests and reappraise his ability. From this, he could choose a course pattern more in keeping with his abilities and, in all likelihood with his true interests. It is a premise of such guidance policy that the University by the mere act of admitting a student is saying that such a student is fully capable of benefiting from a University education and for him to fail represents a direct loss to the University as well as to the nation's manpower resources. The University, then, should feel some sense of obligation to its failing students who because of an unfortunate initial program choice drop out.

The data in this study are in many ways handicapped by small samples and indaequate criteria, e.g., rather than freshman grades it would be more desirable that four year averages should be used. The course coverage is by no means complete, and it may be argued that the predictions make no allowance for the human equation, those non-cognitive factors, such as, motivation, which steer men to greater heights of success—or depths of failure. It remains to be proven how such present measures can effectively add to the cognitive measures proposed. There is every hope that ultimately such non-cognitive variables will add to the prediction of success, but for the present the cognitive measures used in the multiple differential grade prediction equations offer by far the best predictions of academic success. Even here because of unreliability of the criterion measures, prediction efficiencies are, in many instances, lower than those desired. As in any situation in our society involving human destiny, caution must be taken in the interpretation of the data (i.e. the Profile) to the student to permit full freedom of choice. However, interpretation of the Profile is probably easier than the interpretation of a single standardized test score using national norms. Undoubtedly, the prediction equations developed in Alberta can be made more efficient by the addition of other prediction variables to the equation. If universities were prepared to invest in a continuing admissions research program like that at the University of Washington, besides the inclusion of new and better predictor variables, large samples for present predictor and criterion variables could be obtained and the necessary revision of predictor equations, as courses are modified and as the nature of instruction changes, could be accommodated on a year-to-year basis. Undoubtedly, such things will come eventually, facilitated perhaps by implementation of some of the Cameron Commission (1959) recommendations. For the present, however, the above

equations present the best currently available data for the prediction of freshman success at the University of Alberta and as such they should be of direct assistance to the high school counsellor.

REFERENCES

Angell, Melvin A. "Multiple Differential Prediction Significance for College Academic Counseling." *Personnel and Guidance Journal*, XXXVII: 6, February, 1959, pp. 418-423.

Black, Donald B. "A Comparison of the Performance on Selected Standardized Tests to that on the Alberta Grade XII Departmental Examinations of a Select Group of University of Alberta Freshman." *The Alberta Journal of Educational Research.* Vol. 5:3 (September, 1959) pp. 180-190.

_____. "The Prediction of University Freshman Success Using Grade IX Departmental Scores." *The Alberta Journal of Educational Research.* Vol 5:4 (December, 1959), pp. 229-239.

Dvorak, August. "Predicting Success in Different Subjects at the University of Washington." *Minutes of Third Annual Western Regional Conference on Teaching Problems.* Los Angeles: Educational Testing Service. 1954, pp. 8-21.

_____ and Calvin E. Wright. "An IBM Type 650 Program for a Symetric Correlation Matrix with Summed Quantities." *Division of Counselling and Testing Services,* University of Washington, Seattle, Washington: August 1958, 9 pp.

Evenson, A. B., and D. E. Smith. "A Study of Matriculation in Alberta." *The Alberta Journal of Educational Research.* Vol. III:2, (June, 1957), pp. 62-71.

_____. "A Study of Matriculation in Alberta." *The Alberta Journal of Educational Research.* Vol. IV:2, (June, 1958), pp. 67-83.

Horst, Paul. "A Technique for the Development of a Differential Prediction Battery." *Psychological Monograph: General and Applied*, No. 380, Vol. 68, No. 69. American Psychological Association, Inc., Washington, D.C., 1954, 31 pp.

_____. "Differential Prediction of Academic Success." University of Washington, May 1959. A paper presented May 26, 1959, at a conference on selection and educational differentiation under the auspices of the Center for the Study of Higher Education, University of California, Berkeley, California.

_____. "A Technique for the Development of a Multiple Absolute Prediction Battery." *Psychological Monograph No.* 390, 69:5, 1955.

Lunneberg, Clifford E. "Iterative Predictor Selection for a Single Criterion, an IBM Type 650 Computational Program." *Division of Counselling and Testing Services*: University of Washington, Seattle, Washington: March, 1957, 13 pp.

Meehl, Paul E. "Wanted—A Good Cookbook." *American Psychologist,* 11: 263-273, June, 1956.

Province of Alberta. *Report of the Royal Commission on Education in Alberta.* Edmonton: Queen's Printer, 1959.

"EXPLANATION AND THE NEO-MARXIST THEORY OF MENTAL TESTING"

JOHN MACDONALD
Faculty of Education
University of Alberta

Dr. Anderson's (1) article on the above subject in the September issue of the Alberta Journal of Educational Research is characteristically erudite, 'evidence' being quoted from sources as widely separated as the Rebel and Experience and Prediction. Although I wonder what Camus and Reichenbach would find in common around the seminar table, I am willing to admit that each may have something valuable to contribute to the discussion. I do not object to the range of Dr. Anderson's reading (although it might with advantage be extended in the field of Marxism); I should be happier, however, with less appeal to authority and more systematization and integration of ideas. His forty-six references, in fact, appear to afford an inadequate smokescreen against the charge that his thinking on this topic lacks clarity. I find particularly interesting the slow transition, as we read through the paper, from a coldly rational treatment of the nature of causality to a distinctly polemical and emotional approach towards criticism of orthodox mental testing positions.

My first major criticism of the article is concerned with the naivete of Dr. Anderson's stereotypes of the scientist and of science. Besides giving us a philosophical survey of the nature of explanation, he might with profit have examined more closely the reasons why social scientists may so often be found proffering competing interpretations of the same data. The 'cold hard facts' of psychometrics remain so only to the degree that explanation and interpretation are left undone. But, for Dr. Anderson, if there is a controversy between two groups of scientists about the interpretation of a body of data, the only answer is that one side is not acting in good faith; the controversy is between 'good scientists' on the one hand and 'axe-grinders' on the other. 'Good scientists' may be recognized by the degree of their approximation to automatic data processing devices; in particular they are characterized by complete freedom from prejudice, emotional flaccidity, and a massive invulnerability to social conditioning. No wonder Dr. Anderson refers slightingly at intervals to sociologists. He has ignored the whole range of work in the sociology of knowledge. (Since I am to read Camus, I recommend Mannheim (15) as his bedside reading for the next week or two.)

In fact, although Dr. Anderson would no doubt claim that this article records an objective intellectual position, there are certain gaps in reference and deficiencies in approach which suggests that he is far from recognizing all the complexities of the topic. He is content to quote Burt (5) that at least 80% of the differences in intelligence among primary school children should be attributed, on the basis of the evidence, to hereditary causes. Perhaps Burt is not the best person to quote, since it has already been hinted that his opinions are not necessarily representative. However, I notice that nowhere in the article does Dr. Anderson refer to the research in environmental influences on intelligence carried out at the University of Iowa, and described in a series of research reports by Skodak (24), Skeels (22), Skodak and Skeels (25), Skeels and Marm (2), Schmidt (17), and others. Certainly these studies have come under heavy attack from other psychologists, notably McNemar (14), Simpson (21), and Kirk (11). But an examination of their technique of criticism brings the uneasy feeling that they are committed to disbelief before they begin to sift the evidence. Vernon (31) himself says of the Iowa experiments: "it would be advisable to suspend judgment until similar experiments have been repeated under more strictly controlled conditions". It might be added that although the further verification which he requires is a matter of extreme importance, there would seem to be a strong reluctance on the part of critics to conduct their own experiments. Yet at least Vernon mentions Iowa; Dr. Anderson does not. We ought to be grateful, however, that he refrains from quoting directly from the famous Burks (4) experiment, the results of which have constituted a major weapon in the hereditarian armoury for thirty years. But some of the sources on which he is obviously dependent for support do not show such self-denial. Burt (6) is highly commendatory and Vernon (32) writes approvingly: "competent experts like Burks in America . . . calculate . . . that the hereditary contribution to I.Q. variance is three or four times as great as the environmental." All this persists in face of Loevinger's (12) devastating critique of Burks' procedures, published nineteen years ago. Clearly, for some psychologists, standards of criticism vary with congeniality of results.

For my own part, I am prepared to admit the possibility of error in environmentalist points of view. My concern is that environmentalists be given a fair hearing. This the psychometric mandarins have not accorded them. Even contributions to the general discussion like that of Spiker and McCandless (27), who criticize impartially both environmentalists and hereditarians, pointing to an equal laxness of terminology and equal errors of procedure in crucial experimentalist designs, have been discounted or ignored.

I think that Dr. Anderson would also have been well advised to examine the research on the wording of intelligence tests items. Stone (28), for instance, demonstrated clearly that the vocabulary in which many tests are couched is subject to significant social class differentials. It follows that performance differences between social classes on test items need not necessarily be attributed to differences in ability to solve the problems posed by the items.

What I find most distressing in this article, however, is the careless way in which Dr. Anderson refers to 'heredity'. I sometimes think that this word should be banned from the vocabulary of psychologists. I feel sure that geneticists derive amusement for their lesiure hours from perusing the writings of our more noted hereditarians, whose acquaintance with the study of inheritance in man goes no further than the work of Karl Pearson and his disciples. Of the latter let Bateson (2) speak: "Of the so-called investigations of heredity . . . promoted by Professor Pearson and the so-called English Biometrical School it is now scarcely necessary to speak . . . to those who hereafter may study this episode in the history of biological science it will appear inexplicable that work so unsound in construction should have been respectfully received by the scientific world." Statistical inference runs a very poor second to experimental research. In fact, the quantity of experimentally-derived biological evidence which supporters of hereditarian theories of intelligence can provide for our examination is extremely limited. It is true that some experiments have been carried out on shorter-lived, faster-breeding mammals than ourselves. But their findings can bring little comfort to hereditarians. For example, Tryon's (29, 30) apparent success in the selective breeding of 'maze-bright' and 'maze-dull' strains of rats has been hailed as a vindication of accepted theories of the hereditary transmission of abilities. Unfortunately his claims do not stand up to close examination, a fact infrequently reported in psychological texts. Searle (20) investigated Tryon's selected strains and came to the conclusion that the difference between them could be best described as a difference in 'timidity', the poorer learning ability of the dull strain being a consequence of its being more easily upset by certain experimental conditions. This intrepretation is amply supported by the studies of Scott (18) and Fuller (7, 8, 9) on the behavioural differences between breeds of dogs. It is emphasized by Scott (18) and Scott and Charles (19) that the genetically controlled differences in the behaviour of dogs affect emotional traits, such as aggressiveness, timidity, etc., motivational traits, such as the reactivity of animals to rewards, and peripheral characters, such as sensory and motor abilities and preferences. On the other hand, there appears to be absolutely no

evidence for the genetic transmission of a character that might be called 'general mental ability' or 'general intellectual organizing ability'. It would seem not reasonable to hypothesize, on the basis of this research, that the more complex adaptive behaviour patterns of higher vertebrates are, in the main, learned patterns—unless, of course, we determine to run counter to the current of evolutionary theory and regard man as siu generis. Perhaps even Hebb's model requires revision.

Dr. Anderson finds unacceptable the Marxist claim that intelligence tests should be rejected because they do not measure qualitative differences between individuals. But, in consequence of the evidence I have adduced, he surely must consider for serious examination: (1) the possibility that that kind of organizational pattern of behaviour which we conveniently describe as intelligent behaviour may be built up by learning upon a substratum of inherited motivational, emotional, and peripheral tendencies or predispositions; (2) the succeeding possibility that the pattern created may be of the type beloved by field theorists, such that as it develops for an individual it distinguishes him qualitatively from all other individuals; (3) the further possibility that a common cultural context (i.e. membership of the same social class) imposes certain generic similarities upon qualitatively different patterns, so that we may establish pattern taxonomies. These theses do not necessarily conflict with established psychometric data; they could generate more imaginative experiment than has hitherto been the rule; and they have the merit of explaining some inconveniently puzzling results obtained from the testing of primitive peoples (cf. Biesheuvel (3)).

I refuse to enter into a controversy with Dr. Anderson on Marxism. Our frames of reference are so markedly different that this would be pointless. He may obtain my view by consulting a previous article of mine in the *Alberta Journal of Educational Research* (13). With much of the criticism which he levels at Morris, McPherson, Shapiro, and the Simmons I agree. Their writings are typical products of the latter years of Stalinism, reminiscent in every phrase of Zhdanovite cultural authoritarianism. The major reason I have written this reply is that in process of carrying out the not very difficult task of rebuttal Dr. Anderson has expressed a consistent viewpoint which not only Marxists refuse to share. Under the guise of objective science he smuggles in all the time worn hereditarian interpretations of testing data which have been filling the professional journals almost since testing began. A certain degree of erosion is admitted, but in typical debating style Dr. Anderson interprets this as a tribute to the tester. It would be

more accurate to refer to changes in social atmosphere and in the organization of society which make it progressively more difficult to hold views as extreme as those expressed by, for example, Pearson (16). But then Dr. Anderson's conception of the scientist in his social role is poorly structured, a fact which handicaps him sorely as a writer on Marxism. A reading of Sorokin (26), who may be Russian but is no Marxist, would show him how far his point of view is a lineal descendant of other, more primitive, theories of the social distribution of abilities, all of which sought to justify particular social forms by attributing inferior qualities to lower social groups. As experimental social science has developed, its findings, where convenient, have too often been absorbed by the older theories, which have hence acquired a bright new scientific gloss without losing their fundamental orientations.

I regard Dr. Anderson's reply to my previous criticisms of his article as too confused and emotional to merit serious consideration here. One point I shall, however, mention in conclusion. When I state that the social judgments of psychometrists are frequently of a kind which throw in doubt democratic ideals, I am certainly not implying that scientists should conceal or ignore evidence which might explode some cherished social or political ideal. All that I am saying is that, if Dr. Anderson and a large number of other psychometrists are correct, then the majority of our democratic ideals are sheer myth, and the hierarchical society described by Young (33) will be along shortly. I am neither 'living with a happy illusion' nor 'recommending it for others'. Dr. Anderson's real objection to my comments seems to be that I am not prepared to co-operate in allowing him to continue to ignore the social and political implications of his views on mental testing.

REFERENCES

1. Anderson, C. C. "Explanation and the neo-Marxist theory of mental testing." *Alberta Journal of Education Research*, 5, September 1959, 204-221.
2. Bateson, W. *Mendel's Principles of Heredity.* London: Cambridge University Press, 1930.
3. Biesheuvel, S. *African Intelligence.* Johannesburg's South African Institute of Race Relations, 1943.
4. Burks, B. S. "The relative influence of nature and nurture upon mental development." Yearb. Nat. Soc. Stud. Educ., 27, (1), 219-316, 1928.
5. Burt, Sir C. and Howard, M. "The relative influence of heredity and environment." Brit. J. Statist. Psychol., 1957, 10, 99-104.
6. Burt, Sir C. *Intelligence and Fertility.* London, Hamish Hamilton, 1947.
7. Fuller, J. L. "Cross-sectional and longitudinal studies of adjustive behaviour in dogs." *Ann. N.Y. Acad, Sci.*, 56, 214-24, 1953.
8. Fuller, J. L. "Hereditary differences in trainability of purebred dogs." *J. Genet. Psychol.*, 87, 229-38, 1955.

CAMROSE LUTHERAN COLLEGE
LIBRARY

9. Fuller, J. L. and Scott, J. P. "Heredity and learning ability in infra-human mammals." *Eugenics Quart.*, 1, 28-43, 1954.
10. Hebb, D. O. *The Organization of Behaviour.* New York: Wiley, 1949.
11. Kirk, S. A. "An evaluation of the study by Bernadine G. Schmidt entitled: 'Changes in personal, social and intellectual behaviour of children originally classified as feebleminded.'" *Psychol. Bull.*, 45, 321-33, 1948.
12. Leovinger, J. "Intelligence as related to socio-economic factors." *Yearb. Nat. Soc. Stud. Educ.*, 39, (1), 159-210, 1940.
13. Macdonald, J. "A Survey of Soviet education." *Alberta Journal of Educational Research*, 5, 100-111, 1959.
14. McNemar, A. "A critical examination of the University of Iowa studies of environmental influences upon the I.Q." *Psychol. Bull.*, 37, 63-92, 1940.
15. Mannheim, K. *Ideology and Utopia.* London: International Library of Psychology, Philosophy and Scientific Method, 1949.
16. Pearson, K. *The Function of Science in the Modern State.* Cambridge: Cambridge University Press, 1919.
17. Schmidt, B. "Changes in the personal, social and intellectual behaviour of children originally classified as feeble-minded." *Psychol. Monogra.*, 60, No. 5.
18. Scott, J. P. "The effects of selection and domestication upon the behaviour of the dog." In E. S. Russell, ed., Symposium on 25 years of progress in mammalian genetics and cancer. *J. Nat. Cancer Inst.*, 15, 739-58,1954.
19. Scott, J. P. and Charles, M. S. "Some problems of heredity and social behaviour." *J. Genet. Psychol.*, 48, 209-30, 1953.
20. Searle, L. V. "The organization of hereditary maze-brightness and maze-dullness." *Genet. Psychol. Monogr.*, 39, 279-325, 1949.
21. Simpson, B. R. "The wandering I.Q.: is it time for it to settle down." *J. Psychol.*, 7, 351-67, 1939.
22. Skeels, H. M. "Some Iowa studies of the mental growth of children in reaction to differentials of the environment: a summary." *Yearb. Nat. Soc. Stud. Educ.*, 39, (11), 281-308, 1940.
23. Skeels, H. M. and Harms, I. "Children with inferior social histories: their mental development in adoptive homes." *J. Genet. Psychol.*, 72, 283-94, 1948.
24. Skodak, M. "Children in foster homes: a study of mental development." *Univ. Iowa Child Welf.*, 16, No. 1, 1939.
25. Skodak, M. and Skeels, H. M. "A final follow-up study of one hundred adopted children." *J. Genet. Psychol.*, 75, 85-125, 1949.
26. Sorokin, P. *Contemporary Sociological Theories.* New York: Harpers, 1928.
27. Spiker, C. C. and McCandless, B. R. "The concept of intelligence and the philosophy of science." *Psychol, Rev.*, 61, 255-67, 1954.
28. Stone, D. R. "Certain Verbal Factors in the Intelligence Test Performance of High and Low Social Status Groups." Unpublished Ph.D. dissertation, University of Chicago, 1946.
29. Tryon, R. C. "Genetic differences in maze-learning in rats." *Yearb. Nat. Soc. Stud. Educ.*, 39, (1), 111-19, 1940.
30. Tryon, R. C. "Individual differences." In F. A. Moss, ed., *Comparative Psychology,* 330-65. New York: Prentice-Hall, 1942.
31. Vernon, P. E. "Psychological studies of the mental quality of the population." *Brit, J. educ. Psychol.*, 20, 35-42, 1950.
32. Vernon, P. E. "The psychology of intelligence and g." Presidential address, British Psychological Society, 1955. *Bull. Brit. Psychol. Soc.*, 26, 1-15, 1955.
33. Young, M. *The Rise of the Meritocracy.* London: Thames and Hudson, 1958.

DR. MACDONALD AND MENTAL TESTING: A REJOINDER*

C. C. Anderson
Faculty of Education
University of Alberta

It is significant that Dr. Macdonald's opening remarks have the characteristics of the political brawl—a certain amount of feverish heat and personal abuse. I put this down to the fact that, while Dr. Macdonald is well-versed in this game, he is a novice in controversy in the social sciences where a dispassionate scrutiny of evidence is necessary. Accordingly I shall ignore the ranting of the first two paragraphs and concentrate on the paradoxical stuff and science fiction that follows.

Firstly, Burt's findings are written off because ". . . . it has already been hinted that his opinions are not necessarily representative." In reply, it should be pointed out that Burt's statements are findings, not 'opinions', based on adequate evidence. Even his environmentalist opponent does not begrudge him that—but then that same opponent has read Burt's papers, which is a great deal more than Dr. Macdonald has brought himself to do. Again, note should be taken of Dr. Macdonald's new political criterion of scientific truth—the extent to which your 'opinions' are 'representative'. As we shall see, Burt's findings are unacceptable to Dr. Macdonald because they do not provide evidence in support of the particular branch of ideology embraced by himself.

Secondly, I admit that I did not refer to the Iowa studies because they are now so thoroughly discredited by McNemar and others. In an attempt to discredit the latter, Dr. Macdonald resorts to another criterion of scientific truth, his own 'feelings'. "But," he says, "an examination of their technique of criticism brings the uneasy feeling, that they are committed to disbelief before they sift the evidence." I should like to make two points about this: in the first place it does not in the least discredit McNemar—the insignia, 'Approved as evidence by my feelings. J. Macdonald, Esq. Q.E.D.'

*The authors are quite clearly angry young men jousting over a perennial issue which divides men in philosophy, psychology and politics—the extent to which man's cognitive behavior is determined by his biological equipment and by his cultural heritage. The topic is such a burning one that the proponents are driven to write with some fervour. However, the Editor is assured that neither of the authors wishes to question the character or impugn the motives of the other, and that any phrases which might be interpreted to imply the contrary are simply the products of the unwonted heat of the conflict.

Any animosities shown by Messrs. Anderson and Macdonald are quite obviously the product of the fact that, in Spinoza's terms, Reason has dictated different instructions to them.

The Editor.

will not in the foreseeable future be accepted in lieu of rational consideration. In the second place Dr. Macdonald, while quite ready to accept, using his trusty depth perception technique, the notion that McNemar and Burt are the helpless and prejudicied victims of social conditioning, assumes that he is judicially free of all this. It never seems to occur to him (his repressive measures must be admirable) that his interpretations may be determined by his own beliefs and that *he* is smuggling in doctrinaire considerations under the guise of objectivity. Verily we are all out of step except our John. This comes up again in his handling of Vernon who is correct (stout fellow) if he supports Dr. Macdonald and muddled (class prejudice again) if he does not. This sort of approach carries two not unconnected features: the intrusion of the political factor and the atrophy of common sense. Dr. Macdonald is heavily humorous about my own dependence on authorities. This is certainly a weakness of mine, although, unlike Dr. Macdonald, I prefer the authorities with genuine evidence.

Fourthly, Dr. Macdonald drags up the well-known fact that some items in tests have a cultural loading. If he had taken the trouble to read my paper accurately (and not in bed at night), he would have noticed that the plethora of such ambiguous findings, which are of little relevance to the hereditarian-environmentalist controversy, drove me to suggest a more empirical approach towards test results.

Fifthly, I am supposed to use the word 'heredity' carelessly. Dr. Macdonald's assertion that he would like to see the word 'banned' from use by psychologists is a very revealing one since the effect would be to imprison his opponents. Apparently only he and a few chortling geneticists really know how to handle the term. As far as I am aware, Burt (1) uses the term in exactly the same sense as Medawar (2), who is Professor of Zoology and Comparative Anatomy at London University. Isn't that good enough? Or should Burt have deferred to Dr. Macdonald? Incidentally, I think I use the term in Burt's sense.

Sixthly, Dr. Macdonald makes this assertion: ". . . there appears to be absolutely no evidence for the genetic transmission of a character that might be called 'general mental ability' . . .". From this it would seem that Dr. Macdonald's previous assertion that "My concern is that environmentalists be given a fair hearing" is simply a debating tactic. Apart from Burt's evidence (incidentally how can Dr. Macdonald keep making such statements when he has not read Burt?) and his most recent restatement of his opinion (1959), there is the contemporary judgment of Medawar (1959):

> At this point I shall ask you to assume (what I think no one denies) that differences of intelligence are to some degree inborn. There are certain obstinate and persisent correlations of intelligence between parents and their children and between the children of a family among themselves—correlations that do not disappear when as much allowance as possible is made for differences of upbringing, environment and family size. The study of these correlations in the population, generally, and in particular, of the values they take in foster-children and in identical twins who have been reared apart, suggest that not less than half of the observed variation of intelligence is inborn variation." (1959, p. 1068)

Seventhly, Dr. Macdonald's own sally into theorizing ('peripheral tendencies', 'pattern taxonomies' and what not) is both complicated and bizarre. It would seem to run completely counter to Davis's now largely-accepted concept of 'socialized anxiety'. Can I assume from it that the children who now unhappily live in special institutions for the mentally defective are simply suffering from a lack of adequate 'inherited emotional tendencies' and that they can be restored to normal intelligence by proper psychotherapy? I should hope so, but it would be merely a hope at the moment.

Eighthly, we have Dr. Macdonald's erroneous assertion that the changed interpretation of test scores is a product of the changing 'social atmosphere'. In fact it is the product of research evidence which Dr. Macdonald consults only when it suits his ideological fancy. However it is the type of reasoning employed by Dr. Macdonald which interests me. He assumes that I and others would just love to hold the views of Pearson about the hereditary transmission of abilities, but that, alas, we have to settle for a milder form of class prejudice because it is socially desirable to do so nowadays. This is the standard tactic of the ideologue. And once Dr. Macdonald has surrendered to this, he must perforce engage in the following train of thought which has the earmarks of the reasoning Piaget took to be characteristic of children. Because Pearson was a member of the upper classes, he distorted evidence so that he could hold an aristocratic view of the transmission of abilities. McNemar, Burt and Medawar hold somewhat the same view: *therefore* they must have been biased by social conditioning in capitalist countries. Other people like Dr. Macdonald, who hold what they regard as more 'enlightened' political ideas (Stalin having been written off as a bad man), naturally adopt a different view of the transmission of abilities. These views are scientific and, unlike those of Burt, etc., are obtained quite independently of political persuasion. In any case, we have to accept them because they are socially desirable, the 'social atmosphere' being favourable to them. Who is Dr. Macdonald to talk of the twisting of scientific findings to fit 'fundamental orientations'?

Finally there is the talk of 'democratic ideals' and the like, which fits ill with his former support (now quietly abandoned) for the Marxist dictum that the freest man is the slave. What Dr. Macdonald wants me to do is to accept as factual only those interpretations which fit closely his own ideological bias. He has the temerity to assume that I have a bias of which I am unaware, while he has none. Buried in this assumption is the sinister and distressing tendency, evident elsewhere and characteristic of the extreme political partisan, toward authoritarianism. It sems a pity that Mr. Macdonald should squander whatever talents he has in this direction. He is encamped at the barricades and impervious to the more sensible counsels that prevail in uncommitted quarters.

REFERENCES

1. Burt, Sir C. (1959) General ability and special aptitudes, *Educational Research*, February 1959, 1, No. 2, 3-16.
2. Burt, Sir C. (1955) The evidence for the concept of intelligence, *British Journal of Educational Psychology*, 1935, 25, 158-177.
3. Medawar, P. B. (1959) Intelligence and fertility, *The Listener*, 1959, 62, No. 1603, 1067-1069.

FINAL COMMENT

1. I have read Burt, and remain unconvinced.
2. This is the second occasion on which, writing in the Alberta Journal, Dr. Anderson has sought to convict me of political views which I do not hold, and which I have given no indication of holding. Does this arise from a simple-minded attitude to life outside the research laboratory, or is it calculated intellectual McCarthyism? The gist of what I have said can be stated very briefly. In the social sciences we deal not only with 'facts', whatever these may be, but with statements about 'facts'. That my formulation of this simple truth should provoke Dr. Anderson to an orgy of bad logic and argument ad hominem leaves me unrepentant. I am as 'scientific' in my approach to the problem under debate as he is; my definition of 'scientific' is, however, a little less restrictive.
3. I note with interest that, for all his avowed commitment to the scientific method, Dr. Anderson now rejects hypotheses because they are 'bizarre'.

J.M.

BOOK REVIEW

THE EIGHTH GENERATION. By H. Lief, D. Thompson and W. Thompson. New York: Harper, 1960, pp. 346, $6.00.

Developmental studies properly conducted have always provided the teacher and the social scientists with a wealth of valuable information: actuarial-statistical data are accumulated, changing trends are observed which illuminate the social context of behavior, predictions made at the early levels of development can be verified after an interval of time, and the teacher finds out what has happened to his pupils of yesteryear. The present book is no exception, although, because of the restricted sample of subjects interviewed and the exclusively clinical approach used, it provides hypotheses rather than evidence.

In 1940 the American Council on Education published *Children of Bondage*, a report by Davis and Dollard of 76 intensive interviews of coloured adolescents in New Orleans. Lief, Thompson and Thompson, at a distance of 20 years, have now re-interviewed twenty of these children with the laudable intention of finding out generally what happened to them and, specifically, to what extent earlier predictions concerning their later behavior have been accurate. In this task they were aided by a staff of psychologists, anthropologists and psychiatrists, and the somewhat uneven quality of the book may be the product of its being the work of several hands.

The first chapter is a well-written historical account of the social background of New Orleans from the time the first Negro slaves landed until the present eighth generation, of which the present subjects form a part. The educator will be attracted by the great prestige enjoyed by the coloured teacher and the deferential attitude shown to his opinions and attitudes by all sections of the community. The psychologist will be interested in the matriarchal type of family organization and the refusal of the fathers to accept the role of parental models, a fact which influences markedly the behaviour of the child (pp. 30-31). For the sociologists, the significant feature of the chapter may be the statement that class is a more significant determinant of behaviour than colour (p. 27).

The next chapter, headed 'Identification and Identity', which sets out the theoretical framework of the study, is the worst in the book. It is rambling and incoherent and the authors refuse to state exactly and economically what they mean. More of this anon. There follow four pleasant chapters of case studies in which concepts from classical psychoanalysis and the ego-revisionists are mingled with an attractive catholicity of taste. In the final chapter our authors are

once again embattled with the English language. Their comparative success on this occasion is due to their dodging some of the former theoretical entanglements.

The theory is worth considering because, to the present writer's knowledge, this is the first large-scale attempt to use some of Erikson's concepts, although it is disappointing that his earlier *Childhood and Society* is ignored and only the later paper on identity-formation is used. The authors pose the question: "How does the individual relate himself psychologically to the society of which he is a part?" (p. 58). The answer is provided somewhat further back in the text. "The organization of conceptions of self into cultural patterns of identification, is then, a systemization of the first order of importance for understanding the individual in his relation to his society" (p. 64). Accordingly, what are the major patterns of role identification accepted by the individual? What are the dimensions of primary role identification? These dimensions or social worlds to which the individual relates himself are the Middle Class, the Matriarchy, the Gang, and the Family. Four of the 20 children are left-overs, falling into none of these categories, and are credited with a role identification with the unlikely title of 'Marginal'. The Authors remark that "These patterns of primary role identification that we are tracing are then patterns of cultural identification, institutionalized in family life and in the manner of training children." (pp. 84-85)

Emboldened by this thought, they attempt to draw a parallel between primary role identification and Erickson's concept of ego-identity, leaving the present reviewer with the idea that the former determines the latter.

> The development of individual ego-identity has a parallel in the role identification that patterns for each role group, the range of acceptable and unacceptable paths to emotional satisfaction—One's experiences of these roles define for him the aspects of his total social environment that requires emotional commitment—delimiting his psychologically significant social world, structuring the way that affect gratifications can be achieved, setting the conditions under which they will be withheld, and creating anticipatory feelings of security and anxiety. (pp. 87-88)

In their conclusions, the authors completely reverse this statement, suggesting that the primary role identifications, which can be established for most individuals (p. 299), are the product of the early identity formed by each individual for himself.

> "Our data reaffirms, often dramatically, the great importance of significant adults to the shaping of the individual's personality. The presence or absence of such figures and the nature of the model they present are intimately linked to the individual's development of ego ideals: vague or vivid images of what he would like to become . . . The clarity of establishment of ego ideals is an important determinant in the formation of a primary role identification, and this in turn greatly contributes to the

> individual's particular configuration of psychodynamic organization." (pp. 299-300)

There are at least three criticisms to be laid against this confused but interesting book, quite apart from the tortuous and vague quality of the writing. Firstly, the cavalier mixing (pp. 297-298) of revisionist theory with elements of Freudian libido theory cannot be accepted without extensive practical and theoretical justification. Secondly, there is a lack of reference to any background literature apart from Erikson's lone paper, and even then his major work is ignored. Finally, there is a persistent tendency to play down the colour problem. Take, for example, this comment:

> "The problems posed by being Negro, like the problems posed by being male or being female, are met in different ways and with different degrees of adequacy by different individuals, depending on the broader framework of the individual's personality organization and its attendant values." (p. 306)

This is superficial and specious. It is true that men and women have to accept the fact that they belong to one sex or the other, but the amount of 'male prejudice' and 'female prejudice' in the world is negligible in comparison to the amount of colour and race prejudice. The fact of being a Negro has affected the attitudes and personality of all the twenty subjects, and the further fact that some have solved their difficulties by the judicious use of defence mechanisms in no way justifies the assumption that being the recipient of colour prejudice is something a person just has to put up with. The present reviewer has no easy way of solving the problems posed by this prejudice. He is quite confident, however, that one of the ways of not solving them is to ignore them. And, if our authors were so interested in Erikson, they might have read and absorbed his concept of 'black identity' in *Childhood and Society,* where the following summary statement appears:

> The Negro, of course, is only the most flagrant case of an American minority which by pressure of tradition and the limitation of opportunity is forced to identify with it own evil identity fragments, thus jeopardizing whatever participation in an American identity it may have earned. (p. 216)

However these faults should not be allowed to hide the challenging hypothesis, created by the authors, concerning the dimensions of primary role identfication.

Charles C. Anderson
February, 1960